GRAZING USE AND OPEN SPACE STUDY

Grand Teton National Park and Teton County, Wyoming

Review Draft

Report to Congress

Pursuant to Public Law 105-81

February 2001

United States Department of Interior • National Park Service • Grand Teton National Park

EXECUTIVE SUMMARY

This "Grazing Use and Open Space Study" for Grand Teton National Park and Teton County explores various ways to preserve open space lands adjacent to the park that help protect or enhance park resources and values. The study meets the requirements of Public Law (PL) 105-81, and it has been developed by the National Park Service (NPS) with input from representatives from the Wyoming Governor's office, Teton County commissioners, the Secretary of Agriculture, affected landowners, and other interested members of the public. Representatives of these groups made up the Grand Teton National Park Open Space Work Group.

Desired Conditions

The following desired conditions or objectives essentially define the benefits of open space in terms of park resources and values. These desired conditions are based on preferred outcomes for the study defined by the Open Space Work Group.

Preserve natural, physical, and biological processes of parklands.

Maintain or enhance effective wildlife habitat, including corridors within the study area used for migration or other movements.

Maintain or enhance visitors' enjoyment of park resources and values.

Preserve scenic views consistent with park purpose and significance.

Preserve cultural resources that contribute to both the prehistory and the cultural ranching heritage of the park, consistent with park purpose and significance and with NPS standards for historic preservation.

The study area includes approximately 11,551 acres of public land within Grand Teton National Park and a total of 5,539 acres of private land in areas south of the park known as Spring Gulch and South Park. Each property outside the park was evaluated against the following criteria:

Does the property afford views of pastoral scenes, open vistas, and scenic views of the Teton Range?

Does the property contain effective wildlife habitat and corridors that provide access to and from the park?

Does the property contain cultural resources that contribute to both the prehistory and the cultural ranching heritage of the park, consistent with park purpose and significance and with NPS standards for historic preservation?

Does the property help preserve or enhance the natural, physical, and biological processes of parklands?

Does the property maintain or enhance visitor enjoyment of park resources and values?

Options Considered

Based on these criteria, as well as PL 105-81, the desired conditions, NPS policies and mandates, and public issues and concerns as identified by the Open Space Work Group, four options to protect open space within the study area were developed.

Option 1: No New Protection of Study Area Lands; Continue Park Grazing Permits (No Action) — This option would continue the current management program or existing conditions. Grazing permits for those ranches with grazing privileges in the park would be extended in accordance with the provisions of PL 105-81. Grazing would continue to be managed under current practices. No other actions would be taken to protect study area lands outside the park. There would be nothing to prevent the sale and development of the lands, and in accordance with PL 105-81, the associated grazing permits would consequently be lost. However, the continuation of grazing privileges could maintain open space for an undetermined amount of time

Option 2: No New Protection of Study Area Lands; Discontinue Park Grazing Permits — No action would be taken to protect open space on study area lands outside the park. Action could be taken by Congress to discontinue or terminate grazing privileges within the park,

thereby eliminating grazing as granted by PL 105-81. The protection of open space lands would be left to the discretion of nonfederal entities, or it could be accomplished through current development options and open space requirements set forth in the *Jackson/Teton County Comprehensive Plan*. All study area lands outside the park not covered by conservation easements could be sold and developed for residential use under current zoning regulations.

Option 3: Protect Important Open Space Lands, Consistent with Park Values — Study area properties were evaluated in terms of (1) scenic views to and from the park; (2) the significance of buildings, structures, and landscapes associated with the ranching heritage; (3) archeological resources; and (4) their value in providing effective wildlife corridors to and from park lands. Lands were then ranked as to their significance as open space lands in maintaining or enhancing park resources and values. Two sub-options were developed, which would call for the development of a grazing management plan with new terms and conditions.

- *Option 3a: Protect Open Space with a Combination of Methods:* Study area lands in Spring Gulch would be allowed to continue grazing privileges up to 25 years, contingent on the owner placing all lands in a conservation easement. Congressional appropriations to purchase easements would be recommended, along with other tools such as tax incentives or tax law amendments to provide capital gains or estate tax credit. No actions would be taken to protect study area lands within South Park, and grazing permits associated with these lands would be discontinued. The potential development of study area lands within South Park would be subject to Teton County's *Comprehensive Plan.*

- *Option 3b: Protect Open Space by Reallocating Existing Grazing Permits and Other Methods:* Park grazing privileges for study area lands, as provided through PL 105-81, would be continued. Grazing privileges allocated to permittees in South Park would be terminated, and those privileges would be reallocated to permittees in Spring Gulch. The overall number of animals grazed would not exceed current levels. The establishment or continuation of grazing privileges would not exceed 25 years and would be contingent on the owner placing all of these properties in conservation easements. As described for option 3a, congressional appropriations to purchase conservation easements would be recommended, along with tools such as tax incentives or tax law amendments.

Option 4: Protect All Private Study Area Lands, but Discontinue Park Grazing Permits — All park grazing privileges associated with study area lands outside the park would be terminated, and all study area lands outside the park would be protected through the acquisition of conservation easements to ensure the protection of open space, as well as natural and cultural resources. Congressional appropriations to purchase conservation easements would be recommended, along with tools such as tax incentives or amendments to current tax laws that provide capital gains or estate tax credit. A management plan would be developed to restore native plant communities on study area lands within the park that would not be used for grazing.

The environmental analysis contained in this report provides the basis for comparing environmental consequences, both beneficial and adverse, that would result from implementing these options.

The report to Congress in accordance with PL 105-81 will consist of (1) the "Report of the Grand Teton National Park Open Space Work Group," (2) this "Grazing Use and Open Space Study," and (3) a recommendation on a preferred option by the Secretary of the Interior to Congress.

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Abbreviations Used in This Report

AUM	animal unit month
BLM	Bureau of Land Management, U.S. Department of the Interior
NPS	National Park Service, U.S. Department of the Interior
PUD	planned unit development
PRD	planned residential development

INTRODUCTION

This "Grazing Use and Open Space Study" for Grand Teton National Park and Teton County explores various ways to preserve open space lands adjacent to the park that help protect or enhance park resources and values. The loss of the open character of these lands could impact park lands by (1) affecting available wildlife habitat; (2) introducing air, water, and noise pollution; (3) increasing human use; and (4) intruding on the scenic qualities that are so closely associated with Grand Teton National Park, whether these qualities are enjoyed from inside or outside the park.

This study meets the requirements of Public Law (PL) 105-81 (see the text box below for a summary of the law), and it has been developed with input from stakeholders, including representatives from the Wyoming Governor's office, Teton County commissioners, the Secretary of Agriculture, affected landowners, and other interested members of the public.

As stated in PL 105-81, a few ranches make up Teton Valley's remaining open space. As ranching operations become less viable, or if grazing privileges on parklands are terminated, these properties could be subject to subdivision and development. As development occurs:

- Some natural, physical, or biological processes — notably hydrologic systems — could be affected.
- Wildlife habitat, including corridors used for migration or other movements and forage for ungulate species, could be fragmented or become less effective.
- Visitors' enjoyment of park resources and values could decline due to impacts on air quality, less visible wildlife, and interruption of scenic views.
- Scenic views from the park and to the park from adjacent areas could be interrupted.
- Historic scenes associated with ranching could be lost both inside and outside the park.

A SUMMARY OF PUBLIC LAW 105-81

Public Law (PL) 105-81, passed by Congress on November 13, 1997, states in section 1 that

(1) open space near Grand Teton National Park continues to decline;

(2) as the population continues to grow in Teton County, Wyoming, undeveloped land near the Park becomes more scarce;

(3) the loss of open space around Teton Park has negative impacts on wildlife migration routes in the area and on visitors to the Park, and its repercussions can be felt throughout the entire region;

(4) a few ranches make up Teton Valley's remaining open space, and the ranches depend on grazing in Grand Teton National Park for summer range to maintain operations;

(5) the Act that created Grand Teton National Park allowed several permittees to continue livestock grazing in the Park for the life of a designated heir in the family;

(6) some of the last remaining heirs have died, and as a result the open space around the Park will most likely be subdivided and developed;

(7) in order to develop the best solution to protect open space immediately adjacent to Grand Teton National Park, the Park Service should conduct a study of open space in the region; and

(8) the study should develop workable solutions that are fiscally responsible and acceptable to the National Park Service, the public, local government, and landowners in the area.

Section 2 defines the scope of the study:

(1) Assess the significance of the ranching use and pastoral character of the land;

(2) Assess the significance of the use and character of the lands in relation to the purposes for which the Park was established, and identify any need for preserving lands suited to the purpose;

(3) Identify a variety of economically feasible tools and techniques for preserving lands as determined in (2).

(4) Estimate the costs of implementing any recommendations made for land preservation.

Section 3 reinstates and extends grazing privileges granted by the 1950 act to establish a new Grand Teton National Park. This section also provides that if any land subject to the study is no longer being used for ranching or other agricultural purposes, the extension is cancelled.

The complete text of the law in included in appendix B.

Recognizing the complexity of the issues and the variety of divergent viewpoints to be considered during the course of this study, the National Park Service chose a collaborative approach. The Grand Teton National Park Open Space Work Group, which included stakeholders representing divergent viewpoints (as defined by section 2 (c) of PL 105-81) developed a set of preferred outcomes for this study. The National Park Service then evaluated these outcomes and developed a set of desired conditions or objectives that essentially define the benefits of open space in terms of park resources and values. The attainment of the following desired conditions represents the goal for this study:

- Preserve natural, physical, and biological processes of parklands.
- Maintain or enhance effective wildlife habitat, including corridors within the study area used for migration or other movements.
- Maintain or enhance visitors' enjoyment of park resources and values.
- Preserve scenic views consistent with park purpose and significance.
- Preserve cultural resources that contribute to both the prehistory and the cultural ranching heritage of the park, consistent with park purpose and significance and with NPS standards for historic preservation.

PUBLIC ISSUES AND CONCERNS

The options analyzed in this report are designed to fulfill the intent of PL 105-81, while addressing issues and concerns about resource conditions and adverse impacts.

Issues and concerns were defined at public meetings and working group meetings. These issues generally represent the range of opinions in regard to the purpose of and need for action. Statements of issues within this range are listed below (statements are not in priority order):

Domestic livestock grazing in the park damages natural ecosystem processes by prohibiting native vegetation growth and succession.

Converting park lands to natural vegetation types and processes would introduce conditions favorable for noxious weed profusion.

Certain "tools" for preservation of open space as proposed by the Open Space Work Group, the National Park Service, and Congress may infringe on private property rights.

The presence of livestock inhibits the natural use of park habitat by wildlife populations, strains wolf recovery efforts, and causes grizzly bear mortality.

The presence of irrigated pasture enhances forage for native ungulate populations.

The presence of livestock and structures that support grazing detracts from the visitor experience in terms of scenic and recreational opportunities, or an expectation of experiencing a natural setting.

The presence of livestock and structures that support grazing on park lands allows existing ranch and agricultural lands to remain open, preventing further intrusion of development and along its margins.

The presence of livestock and structures that support grazing helps maintain traditional cultural values that are part of the park's heritage.

The maintenance and support for a failing grazing industry interferes with legitimate development interests in the Jackson Hole area.

Continued development on existing open space in the Jackson Hole area affects quality of life values for most current inhabitants of the valley.

BACKGROUND INFORMATION

The Creation of the Park

The birth of present-day Grand Teton National Park involved controversy and a struggle that lasted several decades. Recommendations were first made in the late 1800s to add portions of the Teton country to Yellowstone National Park to protect migrating elk herds and to include the

Teton Range. A bill in 1919 to expand Yellowstone's boundaries into Teton country was unanimously approved by the House of Representatives but died in the Senate when Idaho Senator John Nugent feared the loss of sheep grazing permits with expanded NPS jurisdiction. Also ranchers worried that extending the park would reduce grazing allotments. Also in 1919 proposals emerged to dam outlets of Jenny, Emma, Matilda, and Two Ocean Lakes. Alarmed businessmen and ranchers felt that some form of protection by the National Park Service might be their only salvation from commercialization and natural resource destruction. It still took 10 years to establish Grand Teton National Park in 1929, which only included the Teton Range and six glacial lakes at the base of the mountains.

In the mid 1920s John D. Rockefeller Jr. became involved in efforts to protect and preserve the Teton Valley. He established the Snake River Land Company, which over the next 15 years bought more than 35,000 acres for approximately $1.4 million. The intention was to give these lands to the National Park Service. However, local controversy stalled bills that were introduced in Congress in the 1930s to extend Grand Teton National Park. Finally, in 1943 President Franklin Roosevelt created Jackson Hole National Monument, consisting of Teton National Forest acreage, other federal properties (including Jackson Lake), and the generous 35,000-acre donation by John D. Rockefeller Jr. The Rockefeller lands continued to be privately held until December 16, 1949, when an impasse for adding these lands to the national park was resolved.

After World War II local citizens began to realize that tourism offered an economic future for Jackson Hole. By April 1949 interested parties had begun to work out a final compromise, and a "new" Grand Teton National Park was finally created on September 14, 1950. Public Law 81-787 merged the 1929 park with the 1943 monument, forming an enlarged 310,000-acre park. Preservation of the Teton Range, Jackson Lake, and much of Jackson Hole was now placed in the hands of the National Park Service as a more complete ecosystem.

Special Provisions in the 1950 Legislation

State and local concerns — including grazing — shaped the new park. The 1950 law contained certain provisions that attempted to address these concerns through the continuation of leases, permits, and licenses in existence at the time of the law's passage. Significant provisions in the law included: (1) the protection of existing grazing rights and stock driveways; (2) reimbursement to Teton County for lost tax revenues; (3) the controlled reduction of elk within park boundaries; (4) an agreement that in the future a presidential proclamation could not be used to create a national monument in Wyoming; and (5) allowance for continuation of certain existing uses and access rights to forest lands and inholder properties.

The legislation specifically authorized the renewal of grazing privileges that existed prior to September 14, 1950. Grazing privileges for ranchlands outside park boundaries were to be allowed for a period of 25 years, and thereafter during the lifetime of the person possessing such grazing privileges and the lifetime of his or her heirs, successors, or assigns who were immediate family members at the time. Grazing privileges for ranch lands within park boundaries were to be renewed until the title of said lands was vested in the United States (NPS 2000b).

In 1950 there were 29 legislated permittees grazing approximately 4,230 animals on 67,640 acres in the park. Since then, the number of permittees has decreased as a result of permits expiring in accordance with the park's legislation, ranches ceasing to operate, and other reasons. By 1999 there were only six legislated permittees, 1,907 head of authorized livestock, and 24,792 acres designated for grazing.

The 1976 *Jackson Hole Land Use Study*

In reaction to concerns about the protection of lands adjacent to the park in the 1970s, the National Park Service began a comprehensive study of possible boundary modifications adjacent to the park in 1975. The study included other federal and state agencies, as well as the private sector. These coordinated efforts culminated in the 1976 *Jackson Hole Land Use Study.*

The study analyzed two levels of concern: First, it addressed how to protect lands that are critical to the management and enjoyment of the park. Second, it addressed the areawide concern of how to protect the pastoral and scenic qualities of Jackson Hole. The area south of the park was evaluated with the objective to "protect the pastoral, scenic, and environmental qualities of the area; and maintain moose, deer, and waterfowl habitat." The study recommended that minor boundary adjustments be made to resolve park-related problems and that a Jackson Hole scenic area be established by Congress. The scenic area was to include private lands south of the park and north of the town of Jackson, as well as areas within the park, the National Elk Refuge, the Bridger-Teton National Forest, Bureau of Land Management (BLM) lands, and state lands. The study called for most private lands to remain in private ownership, and an advisory commission was to be established to oversee the management of the scenic area. A bill was introduced to Congress in 1977 to establish the scenic area, but it was not passed.

Recent Concerns

By the mid 1990s the number of permittees grazing in the park declined to eight permittees who were grazing about 1,450 animals on 24,790 acres. Five of these permittees are within park boundaries (see NPS 2000a):

- the Moosehead Ranch and Pinto Ranch graze horses and cattle, respectively, under the authority of the 1950 legislation
- the JY Ranch grazes horses, as allowed by the *Code of Federal Regulations* as "a necessary and integral part of a recreational activity
- the Teton Valley Ranch grazes cattle as "required under a reservation of use rights arising from acquisition of a tract of land" through the lifetime of the present owner
- the Triangle X Ranch grazes horses under the authority of concession contract as part of its dude ranch operation.

The remaining three ranches — the Mead/Hansen Ranches, the Jackson Hole Hereford Ranch, and the Moulton Ranch — are outside park boundaries but had rights to continue to graze in the park through the lifetime of the designated heirs.

By 1997 the grazing permits of the Mead/Hansen and the Jackson Hole Hereford Ranches had expired as a result of the unexpected deaths of the permit holders. With this change in circumstances, some community members expressed heightened concerns over potential development threats to the ranchlands. As result Congress passed Public Law 105-81 on November 13, 1997, which requires a study of grazing use and open space within and adjacent to Grand Teton National Park.

Today, protecting open space near the park continues to be a concern with residents and ranchers in the Jackson Hole area. Conditions are changing rapidly: local and visiting populations have greatly increased; residential and commercial development on private lands near the park has increased dramatically; and the grazing industry and livestock market have become more tenuous so that financial and tax pressure has been driving many agricultural landowners to sell their properties.

CATTLE RANCHING OPERATIONS

Cattle ranching in Jackson Hole is typical of high mountain valley ranching. Generally, ranchers in Jackson Hole plan to feed their cattle hay for about six months per year, as opposed to lower elevations where there is less snow and hay feeding can be minimized. The size of the ranch determines how much hay can be produced, and therefore, how many cattle can be fed for the winter. The economics of cattle ranching preclude trucking hay into Jackson Hole. Also, there must be ample range during the summer to accommodate this number of cattle. Historically, the ranchers of Jackson Hole have grazed their cattle on public lands during the summer and fall months, while cultivating hay on their private ranches to provide winter feed.

Some ranchers in the area have a cow-calf operation. In a cow-calf operation, calves are born in March and April and remain with the herd to nurse through the summer and fall. Bulls are introduced to the pasture for breeding purposes, usually in July, for a period of two estrus cycles. The herd is taken off the range in the fall, and at some point the calves are separated from the

Table 1: Ranches in the Open Space Study Area outside Park Boundaries

Ranch	Owner(s)	Acres (ranch)	Number of Animals Grazed in the Park	Acres (Allotment)	AUMs
Mead	Mary Mead Revocable Trust	2,960	682 cattle		3,414
Hansen	Cliff and Martha Hansen	(incl. above)	None		None
Box L	Rod and Joyce Lucas	784	None		None
Lazy Double A	Phil and Betty Lucas	900	None		None
Jackson Hole-Hereford	Robert Gill, Elizabeth Lockhart, and the Robert Bruce Porter Trust	895	420 cattle		2,100

Note: An AUM is defined as the amount of air-dried forage required to support a cow with her calf for 30 days.

rest of the herd and sold at auction. The rest of the herd winters on the ranch until the following year, fed on the hay produced during the growing season.

Ranchers with grazing privileges are permitted a number of animal unit months (AUMs). An AUM is the amount of forage needed by an animal unit (one mature cow and her nursing calf) grazing for 30 days. It is assumed that a nursing cow will consume 26 pounds of dry matter per day, or about 780 pounds per month. The acreage needed to supply one AUM depends on several factors, including soils, weather, and irrigation.

The Mead/Hansen Ranches and the Jackson Hole Hereford Ranch are cow-calf operations with yearlings. Each ranch has a permit to graze cattle on park lands during the summer. However, they operate on summer range as the Potholes Grazing Association and share the same allotments. The two permits total 5,514 AUMs (see Table 1).

Approximately 1,000 cows, most with a calf, graze on park lands. Cattle enter the southern pastures on June 1, and about June 25 the cattle are trailed to the northern pastures. Formerly the cattle remained on the northern pastures until about mid-October when they were trailed back south and out of the park around November 1. However, in recent years cattle have been trailed south earlier in order to avoid conflicts with the elk reduction program (which starts around October 10) or to avoid conflict with denning wolves. Also there has been insufficient forage due to drought.

All fences around the northern and southern pastures are maintained by the National Park Service. In recent years park staff have been using temporary and portable electric fencing to create smaller subpastures in a management-intensive grazing system to improve pasture management as well as to reduce conflict with wolves and bison. All electric fencing and irrigation is done by NPS personnel.

THE STUDY AREA

Lands Identified in PL 105-81

PL 105-81 defines the study area as Grand Teton National Park and associated use of certain agricultural and ranch lands within and adjacent to the park, including "(1) base land having appurtenant grazing privileges within Grand Teton National Park remaining after January 1, 1990, . . . and (2) any ranch and agricultural land adjacent to the Park, the use and disposition of which may affect accomplishment of the purposes of the Act." (See the Study Area map.)

- Base land suggests that the study area would include private ranches inside the park (the Moosehead and Pinto ranches) and private ones outside the park (the Mead/Hansen, Jackson Hole Hereford, and Moulton ranches). All five have appurtenant privileges.
- Any ranch or agricultural land suggests that the study area would include large tracts of private ranch lands around the perimeter of the Grand Teton such as the Snake River Ranch at the southwest boundary and the Feuz ranch near the east boundary.

However, section 1 of the public law suggests that the study area is composed of some, but not all, of the base land having appurtenant privileges; and some, but again not all, of the agricultural land surrounding the park.

Based on section 1 of PL 105-81, and using the legislative history as a guide, the study area has been defined to include the following ranches:[1]

- the 2,960-acre Mead/Hansen Ranches, which is directly south of Grand Teton National Park in Spring Gulch, an area between East and West Gros Ventre Buttes (depends on summer grazing in the park)
- the 900-acre Lazy Double A, which is in the Spring Gulch area and whose eastern edge adjoins the national park and whose western edge is just across the road from the northern part of the Mead Ranch
- the 784-acre Box L Ranch, which is in the Spring Gulch area south and west of the Lazy Double A and south of the northern part of the Mead Ranch
- an 895-acre portion of the Jackson Hole Hereford Ranch, which is south of the town of Jackson in an area known as South Park (depends on summer grazing in the park)
- the 11,551 acres of public lands inside the Grand Teton National Park that the Mead/ Hansen Ranches and the Jackson Hole Hereford Ranch use for summer grazing

This comes to a total of 5,539 acres of private land and 11,551 acres of public land.

Other Lands within the Park Not Included in this Study

Other ranches within the administrative boundaries of the park include the Moosehead Ranch, the Pinto Ranch, the Teton Valley Ranch, the JY Ranch, and the Triangle X Ranch. Although these ranches have grazing privileges within the park, they are not part of this study because the authority for these ranches to graze in the park is granted by means other than PL 105-81. Although actions suggested in this document are analyzed with these operations on a cumulative basis, there is no proposal to change the grazing status of these ranches.

LEGAL AND POLICY FRAMEWORK FOR THIS STUDY

Park Establishment Legislation

The act of September 14, 1950 (64 Stat. 849) repealed all previous park establishment legislation and provides that the park be administered in accordance with general statutes governing national parks. The purpose of the park is for public benefit and enjoyment

Park Purpose and Significance

More specific purpose and significance statements for Grand Teton National Park are based on the park's establishing legislation. They reiterate why the area was set aside as a national park unit, thus helping define management priorities for the protection of those resources and values.

Park Mission Statement

Grand Teton National Park is dedicated to the preservation and protection of the Teton Range and its surrounding landscapes, ecosystems, cultural and historic resources. The singular geologic setting makes the area and its features unique on our planet. Human interaction with the landscape and ecosystem has resulted in an area rich in natural, cultural and historic resources that represents the natural processes of the Rocky Mountains and the cultures of the American West.

Park Purposes

The purposes of the park are to

- Preserve the dramatic scene of the Teton Range and the Piedmont Lakes.

1. The names of the ranches used throughout this document — Mead/Hansen, Lazy Double A, Box L, and Jackson Hole Hereford — are the ones used locally and are used mostly by convenience. Legally, these ranches may be divided into various smaller parcels held by any number of individuals, partnerships, trusts, or companies.

   The Moulton Ranch is not included in this study because prior to her death Ms. Moulton placed a conservation easement over 511 acres of the ranch, which keeps the ranch in agricultural use in perpetuity. Therefore, this property is not subject to development and the loss of open space.

- Preserve and learn from a rare example of the fault block uplift process found in a relatively accessible and compact area.
- Provide the opportunity for people to have an emotional, inspirational, aesthetic response to the unspoiled scene.
- Preserve, study, learn from, and interpret the diversity of natural habitats and species that are significant components of the Greater Yellowstone ecosystem.
- Preserve and interpret the cultural resources representative of the continuum of prehistoric and historic human interaction with the Teton Range and Jackson Hole.
- Provide opportunities for physical interaction compatible with the park's resources.

Significance

Geologists regard the Teton Range as one of the most impressive examples of fault-block mountains in the world. The peaks of the range, which tower 3,000 to 7,000 feet above the sagebrush flats of Jackson hole and culminate in the Grand Teton (1 3,770 feet), dominate the park landscape. They are the youngest mountains of the Rocky Mountain chain and began to rise about 9 million years ago.

Several piedmont lakes rimmed by moraines from the last glaciation lie adjacent to the range and form part of the scenic foreground. The park also includes 25.5 miles of the Snake River. In addition to being an outstanding recreational resource, the Snake River is one of the last remaining natural habitats of the cutthroat trout.

The flora and fauna are typical of the Central Rocky Mountain region. Forested areas are a mixture of limber pine, lodgepole pine, whitebark pine, Englemann spruce, subalpine fir, and Douglas fir. Scattered patches of aspen are found at lower elevations. Cottonwood, willow, and Colorado blue spruce line the Snake River and its tributaries, and sagebrush dominates the valley floor.

Fifty-four species of mammals inhabit the park. Elk, moose, pronghorn, mule deer, and bison are common. Bighorn sheep can be found in the higher mountains. Other mammals include beaver, muskrat, coyote, pika, and Uinta ground squirrel. Black bears are common in forested areas. The grizzly bear, a threatened species, occasionally roams into the northern part of the park.

Bird life in the park is varied. The endangered bald eagle and peregrine falcon nest in the park. Other prominent species are the white pelican, great blue heron, trumpeter swan, Canada goose, sandhill crane, sage grouse, golden eagle, common raven, several species of woodpeckers, and a variety of songbirds.

The park's physiographic and biologic features fall within the Middle Rocky Mountains natural region and include features representative of the themes of mountain systems, works of glaciers, geologic history, alpine tundra, boreal forest, lakes and ponds, and rivers and streams.

NPS *Management Policies*

NPS *Management Policies* provide general direction on various national and servicewide laws and policies. Chapter 8, “Use of the Parks,” speaks specifically to grazing in national parks. The policies state:

> Commercial grazing or stock driveways will be allowed only in those parks where (1) they are specifically authorized by federal law, (2) they were retained as a reserved right arising from NPS land acquisition, or (3) when conducted as a necessary and integral part of a recreational activity or required to retain a historic scene. Grazing and stock driveways will be eliminated in all other parks. . . . Grazing will be managed and conducted in accordance with standards and procedures designed to ensure that it does not result in significant damage to park resources. (§ 8:14)
>
> Where grazing or livestock trailing is otherwise allowed but its continuation would conflict with public enjoyment of park resources or would interfere with the functions of the natural ecosystem, the National Park Service will eliminate grazing whenever possible, through orderly and cooperative procedures with the individuals or organizations concerned. (§ 8:15)

Grand Teton National Park *Master Plan*

Grand Teton National Park's *Master Plan,* approved March 19, 1976, describes the existing legislative background, including commitments, the resource, land status, and regional considerations. It also summarizes current knowledge and trends about interpretation, resource management, resource use and capacities, development ceilings, and regional planning. The plan classifies lands according to existing or allowable uses and development levels. It also subdivides the park by visitor experience zones.

Under the park's zoning classification scheme, most of the grazing allotments associated with grazing privileges lie within the Natural Environment zone (land class III). Within this area valley lands are committed to special uses as defined by legislation, including grazing, stock driveways and life estates. The value of these lands is referred to as comparable to Outstanding Natural (class IV), and eventually they should be considered for designation as Outstanding Natural or Primitive (class V) lands if and when adverse uses are eliminated.

There are no management objectives in the *Master Plan* that are specific to grazing. The most applicable objective under resource management is:

> To manage the biotic resources of the park for the purpose of perpetuating the indigenous plant and animal associations of the Teton Range and Jackson Hole, in a condition of as nearly natural dynamic equilibrium as is feasible.

RELATIONSHIP OF THIS STUDY TO LOCAL PLANS AND CONSERVATION EFFORTS

Report of the Open Space Work Group

In accordance with section 2(c) of PL 105-81, the National Park Service initiated a study process to seek input from stakeholders that included representatives from the Wyoming Governor's office, Teton County commissioners, the Secretary of Agriculture, affected landowners, and other interested members of the public.

Recognizing the complexity of the issues and the variety of divergent viewpoints to be considered, the National Park Service chose a collaborative study approach, with stakeholders representing these divergent viewpoints. Stakeholder representatives were organized into a 15-member Open Space Work Group, which then met in a series of open facilitated meetings over two years. The work group was charged with addressing the tasks defined in section 2(b) (1)–(3) of PL 105-81.

The findings and recommendations of the work group are summarized in the "Report of the Grand Teton National Park Open Space Work Group." Despite divergent viewpoints and lack of consensus on some issues, such as grazing on parklands, the work group agreed on the following general findings, as stated in the report:

- Current tax laws inhibit the transfer of large land holdings between family members.
- The loss of summer grazing options threatens the viability of working ranches.
- There is an economic value for the ranchers derived from grazing permitted in the Park and a cost to the NPS to manage and maintain the grazing permits.
- Preservation of open space near and adjacent to Grand Teton National Park is important for maintaining scenic, wildlife, and cultural values.

Based on these findings, the work group recommended using the following methods or tools to help protect open space lands near the park. Some of them have been considered in the land protection options analyzed in this report.

1. *Modification of tax laws* — Current estate tax provisions, when applied to the high value of the 8,000 acres of private ranchland in Teton County, translates to an inheritance tax burden for heirs of over $100 million. Current laws only provide tax incentives for gifts of land or easements, specifically for the purpose of conservation. These provisions do not help conserve the lands of those ranchers who cannot afford to give the land to a public or private agency. Furthermore, current provisions only allow incentives for lands within certain areas, but they do not provide for multi-

generational beneficiaries, and they are complicated. On a national scale, because of the current tax code, along with large monetary offers by developers, agricultural land is permanently lost to development at a rate of 1 million acres annually in the United States.

2. *Acquisition of easements* — Landowners and easement buyers may enter into a voluntary agreement for the donation or sale of a conservation easement. A conservation easement consists of a voluntary contract between the landowner and another entity by which the landowner maintains ownership of the land while relinquishing the right to develop it. Easements are flexible in nature and can offer tax deductions. In order to benefit from current federal income tax deduction allowances, the landowner must donate the easement in perpetuity or offer the property in a "bargain sale" (below market value). The charitable deduction is based on the effect of the easement on the value of the land.
3. *Buy out grazing permits* — Compensation for the termination of grazing privileges would be based on the negotiated value of the permits to the ranchers. This would be a means of compensating the landowner for ceasing grazing in the park.
4. *Subsidizing hay* — In lieu of summer grazing in the park, winter feed would be subsidized for the ranchers (i.e., hay would be transported from sources other than landowners' base operations so that cattle could graze on base lands during the summer). Sources for payment of subsidized costs could include the Department of the Interior, private foundations, conservation organizations, land trusts, and/or any person or organization with an interest in perpetuating open space.
5. *Grazing* — Identify grazing options that are feasible in terms of economic viability (cost per AUM and proximity to ranchlands) and availability. There was no agreement among work group members about the appropriateness of continuing grazing within Grand Teton National Park as an option. Concomitantly, discussions of grazing on private lands found no feasible grazing options in Teton County, due to the lack of large, undeveloped pasturelands.

Jackson/Teton County Comprehensive Plan

The 1994 *Jackson/Teton County Comprehensive Plan* provides policy guidance for land use and zoning on study area lands outside the park. The plan provides a vision and a guide for an ongoing planning process. The community vision addresses issues relating to open space, and it states that the public has a desire to retain a rural western character and to preserve open space. The vision includes the preservation of scenic vistas, wildlife diversity and abundance, the continuation of ranching and other traditional agriculture, good quality air and water, nodes and clusters of affordable housing, among other elements. The plan states that the county should "encourage the preservation of the rural character, critical wildlife habitat and important image-setting scenic vistas and corridors, . . . and the continuation of ranching and other types of traditional agriculture as a vital part of community character." Where future development may occur, the county further encourages clustered development along with open space preservation and wildlife and scenic resource protection. The county plan puts these vision statements into the form of a guiding principle:

> Teton County's wildlife and scenic resources are a local and national treasure, and, therefore, the community recognizes a stewardship responsibility for their protection. Future development in Teton County will take place in this context.

Teton County's land development regulations generally apply to the development of unincorporated lands. Nonfederal lands within the study area are currently undeveloped except for facilities related to ranching and associated residences. Future development should conform to the guiding principle quoted above.

All ranch properties within the study area fall within the regulations for working ranch subdivisions (article II, section 2350):

> Working ranch and active agricultural lands may be subdivided in up to five lots over ten years, with each lot being at least 35 acres.

This development is exempt from open space standards for residential development, although

construction must be outside areas defined in the plan's natural and scenic resource overlays.

Current zoning would allow for residential development of the properties in the study area with an approved development plan. Standards for such development provide for denser clustering of dwelling units and the preservation of open space for wildlife, scenic, and agricultural purposes in concert with article IV, division 4300, of the plan. The standards and zoning regulations incorporate natural and scenic resource overlays; provisions for floodplains, wetlands, and waterbodies; certain wildlife habitats; and other public benefits (section 4330).

Teton County has developed two overlay protection districts, which are applied over current county land use zoning:

- The natural resources protection district provides added protection to those lands evaluated as critical wildlife habitat or important to wildlife migration.
- The scenic resources protection district preserves and maintains the county's most frequently viewed scenic resources, which are important to both its character and economy.

These overlay districts are discussed in more detail beginning on page 38. Given the county plan vision and guidance, any proposed development on private lands within the study area would require a site-specific environmental analysis.

Local Conservation Efforts

The Jackson Hole area has long been a focal point for land protection efforts. Three agencies are primarily responsible for land protection in Teton County — the Teton County Scenic Preserve Trust, the Jackson Hole Land Trust, and the Nature Conservancy.

Teton County Scenic Preserve Trust

The Teton County Scenic Preserve Trust is associated with the Teton County government, and the board of trustees is comprised of the Teton County commissioners. The trust was created in 1978, with the intent of gaining funds from Congress to protect scenic areas. This goal was never achieved, and over the years the Scenic Preserve Trust has evolved into a part of Teton County's planned residential development (PRD) program.

The Scenic Resources Overlay Protection District would be one means to ensure the protection of scenic values in different areas and to regulate the amount and type of development in each area. In any area that has been zoned rural, the regulations stipulate that the minimum size of a residential lot is 35 acres. If a landowner in a rural district wants to develop his or her property at a higher density, then the county requires that a certain amount of this land, ranging from 50% to 85%, must be set aside as open space and protected by a conservation easement. The landowner may choose the organization that will hold the easement. In most cases landowners donate these easements to the Teton County Scenic Preserve Trust, as they often do not contain the special wildlife or scenic values that the Jackson Hole Land Trust or The Nature Conservancy requires.

Teton County is primarily concerned with maintaining a certain quantity of open space in the valley, not with preserving wildlife habitat or other specific natural resources. As a result, easements held by the Scenic Preserve Trust may be less restrictive than those held by private conservation organizations. While most easements held by the trust are a result of the PRD program, the county also accepts other easement donations.

Currently, the Teton County Scenic Preserve Trust has protected approximately 3,082 acres in the county. Of these, 13 acres are owned in fee and 3,069 acres are protected through conservation easements. The Open Space map displays 2,710 acres of easements and 12 acres of fee-ownership lands held by the trust. (The Open Space map acreages are based on GIS estimates.)

Jackson Hole Land Trust

The Jackson Hole Land Trust is a private, nonprofit organization founded in 1980 to preserve the critical wildlife habitat, magnificent scenic vistas, and historic ranching heritage

associated with open space in Jackson Hole. This trust uses two methods for land protection. The primary method is to work with landowners to preserve open space and to restrict development through conservation easements, using a conservation buyer program. The second method is through fee acquisition. Much of this land is visible from viewpoints within Grand Teton National Park and from major roads.

Since its establishment, the Jackson Hold Land Trust has ensured the permanent protection of over 12,135 acres; approximately 8,515 acres of which are in Teton County. The trust holds 103 conservation easements in Teton County and 57 parcels (approximately 612 acres) in fee (45 of which are 1-acre trust parcels). All of the land owned in fee and 95 of the conservation easements (totaling 7,956 acres) are in Teton County.

The Open Space map displays 534 acres of land owned in fee and 6,452 acres of easements held by the Jackson Hole Land Trust. These lands are located in and around Spring Gulch. (Acreages are based on GIS estimates.)

In addition, over the years the Jackson Hole Land Trust has transferred ownership of three parcels of land to governmental agencies. The Forest Service accepted an 80-acre parcel, the Fish and Wildlife Service a 5-acre parcel, and the town of Jackson a 4-acre parcel.

The Nature Conservancy

The Nature Conservancy is a national conservation organization dedicated to the conservation of biodiversity. The Wyoming chapter is active in working with landowners to conserve land throughout the state. The conservancy has protected 1,891 acres in Teton County. The Open Space map shows five properties with Nature Conservancy easements totaling 1,885 acres. Most of these properties were accepted as donations. One of these easement properties (totaling 536 acres) is owned in fee. The conservancy also owns 6 acres of trust parcels. The Nature Conservancy hold a conservation easement over 400+ acres of the Lazy Double A Ranch, and it owns the Moulton Ranch in fee.

THE SCOPE OF THE REPORT TO CONGRESS

The report to Congress in accordance with PL 105-81 will consist of three components: (1) the "Report of the Grand Teton National Park Open Space Work Group," (2) this "Grazing Use and Open Space Study," which includes an analysis of the options to protect open space, and (3) a recommendation on a preferred option by the Secretary of the Interior to Congress.

The "Report of the Grand Teton National Park Open Space Work Group" provides a framework and suggests a variety of land protection tools that could be used to help protect open space, in accordance with section 2(b) of PL 105-81.

This "Grazing Use and Open Space Study" draws from the findings of the work group and addresses estimated costs. The environmental analysis contained in this report provides the basis for fully analyzing and comparing environmental impacts, both beneficial and adverse, resulting from actions to protect open space adjacent to park lands.

OPTIONS TO PROTECT OPEN SPACE

THE RANGE OF OPTIONS

Options to protect open space within the study area were developed based on NPS policies and mandates, the purpose and significance of the park, local policies, public issues and concerns, and the findings of the Open Space Work Group, as well as the direction provided by PL 105-81. Once the desired conditions were formulated for the study, various ways of achieving them were generated.

Criteria for Developing the Options

Using the purposes stated in PL 105-81, and further articulated in the desired conditions, each study area property outside the park was evaluated against the following criteria:

- *Does the property afford views of pastoral scenes, open vistas, and scenic views of the Teton Range?*

  It was determined that study area lands in the northern Spring Gulch area (the Mead, Lazy Double A, and Box L Ranches) all met these criteria, while lands in the southern Spring Gulch area (the Hansen Ranch) partially met the criteria, and lands in South Park (the Jackson Hole Hereford Ranch) did not meet the criteria. (See appendix C.)

- *Does the property contain effective wildlife habitat and corridors that provide access to and from the park?*

  In order of habitat quality, the ranchlands are ranked in the following order: Mead, Hansen, Lazy Double A, Box L Ranch, and Jackson Hole Hereford Ranch.

- *Does the property contain cultural resources that contribute to both the prehistory and the cultural ranching heritage of the park, consistent with park purpose and significance and with NPS standards for historic preservation?*

  All properties are of equal ranking in terms of historic resource and cultural landscapes.

Two additional criteria were developed that do not directly relate to the criteria above. These criteria were used in the environmental analysis process for the options:

- *Does the property help preserve or enhance the natural, physical, and biological processes of parklands?*

  See sections in the environmental analysis pertaining to vegetation condition and use, water resources, wildlife habitat, air quality, and threatened, endangered, or sensitive species.

- *Does the property maintain or enhance visitor enjoyment of park resources and values?*

  See sections in the environmental analysis pertaining to scenic views, cultural resources, wildlife habitat, visitor experience, and threatened, endangered, or sensitive species.

Other Public Benefits

PL 105-81 directs that the study assess the significance of the ranching use and pastoral character of the land, including other public benefits; however, the law does not specifically articulate what these benefits are. The Open Space Work Group defined and analyzed possible public benefits derived from the protection of open space. These include economic factors resulting from tourism; the natural beauty and quality of views of open space (including views of hayfields, ranchlands, and critical wildlife areas), clean air and water, and cultural heritage. Views of various community groups related to public benefits of options considered in this study are discussed in appendix E.

Assumptions Guiding the Development of Options

The options were guided by the following assumptions:

- If not protected as a result of recommendations in this study, study area lands would be

developed in accordance with existing land use and zoning regulations.

- When open space protection is considered, the entire property would be subject to such measures.
- Conservation easements would be permanent.
- Congress would appropriate funds to purchase conservation easements.
- The National Park Service would be granted authority to administer the easements.
- Easements would be written to ensure that natural and cultural resources would be protected.

OPTION 1: NO NEW PROTECTION OF STUDY AREA LANDS; CONTINUE PARK GRAZING PERMITS (NO ACTION)

This option would continue the current management program or existing conditions, and it constitutes a no-action option in terms of providing a "baseline" condition for comparing the other options.

In this option grazing permits for those ranches with grazing privileges would be extended in accordance with the provisions of PL 105-81. Grazing would continue to be managed under current practices. No tax incentives or amendments to current tax laws would be considered under this option. No other actions would be taken to protect study area lands outside the park. There would be nothing to prevent the sale and development of the lands, and in accordance with PL 105-81, the associated grazing permits would consequently be lost. However, the continuation of grazing privileges could maintain open space for an undetermined amount of time

Spring Gulch

Study area lands in Spring Gulch are subject to Teton County's scenic resource and natural resource overlay districts. Regardless of the density, any development proposal would require an environmental analysis showing compliance with these overlay districts. Current zoning permits a range of development densities, some of which require the preservation of open space. Densities of up to one dwelling unit per 35 acres could be achieved without a county subdivision review. If the county's planned residential development (PRD) standards were applied, an average density of approximately one dwelling unit per 5 acres could be achieved if a development plan was submitted and critical wildlife habitat and scenic viewsheds were protected as open space.

South Park

Study area lands in South Park are subject to the Teton County's scenic resource and natural resource overlay districts. Regardless of the density, any development proposal would require an environmental analysis showing compliance with these overlay districts. Current zoning would permit a range of development densities, some of which require the preservation of open space. Densities of up to one dwelling unit per 35 acres could be achieved without a county subdivision review. If county PRD standards were applied, an average density of approximately one dwelling unit per 2 acres could be achieved if a development plan was submitted and critical wildlife habitat and scenic viewsheds were protected as open space. The area is being considered for annexation by the town of Jackson. If annexed, this property could be developed at higher densities than county regulations allow.

OPTION 2: NO NEW PROTECTION OF STUDY AREA LANDS; DISCONTINUE PARK GRAZING PERMITS

In this option no action would be taken to protect open space on study area lands outside the park. Action could be taken by Congress to discontinue or terminate grazing privileges within the park, thereby eliminating grazing as granted by PL 105-81. No action would be taken to restore native plant communities on study area lands within the park. There would be nothing to prevent the subsequent sale or development of these lands. The protection of open space lands would be left to the discretion of nonfederal entities, or it could be accomplished through current development options and open space requirements set forth in the *Jackson/Teton County Comprehensive Plan*. No tax incentives

or amendments to current tax laws would be considered under this option.

Under this option all study area lands outside the park not covered by conservation easements could be sold and developed for residential use under current zoning regulations in accordance with the *Jackson/Teton County Comprehensive Plan.* The full range of residential densities, in accordance with the county plan, would be possible.

Spring Gulch

Study area lands in Spring Gulch are subject to Teton County scenic resource and natural resource overlay districts. Regardless of the density, any development proposal would require an environmental analysis showing compliance with these overlay districts. Current zoning would permit a range of development densities, some of which would require the preservation of open space. Densities would be the same as for option 1 (up to one dwelling unit per 35 acres without a county subdivision review; if county PRD standards were applied, an average density of approximately 1 dwelling unit per 5 acres could be achieved if a development plan was submitted and critical wildlife habitat and scenic viewsheds were protected as open space).

South Park

As described for option 1, study area lands in South Park are subject to Teton County's scenic resource and natural resource overlay districts. Regardless of the density, any development proposal would require an environmental analysis showing compliance with these overlay districts. Development densities would be the same as those described for option 1 (up to one dwelling unit per 35 acres without a county subdivision review; approximately one dwelling unit per 2 acres if county PRD standards were applied, a development plan was submitted, and critical wildlife habitat and scenic viewsheds were protected as open space). If this area was annexed by the town of Jackson, densities could be higher than those allowed by the county.

OPTION 3. PROTECT IMPORTANT OPEN SPACE LANDS, CONSISTENT WITH PARK VALUES

In this option properties were evaluated in terms of (1) scenic views to and from the park; (2) the significance of buildings, structures, and landscapes associated with the ranching heritage; (3) archeological resources; and (4) their value in providing effective wildlife corridors to and from park lands. Lands were then ranked as to their significance as open space lands in maintaining or enhancing park resources and values. Two sub-options were developed, which would call for the development of a grazing management plan with new terms and conditions.

Option 3a: Protect Open Space with a Combination of Methods

Spring Gulch

Study area lands in Spring Gulch where the owner had existing grazing privileges would be allowed to continue grazing privileges up to 25 years, contingent on the owner placing all lands in a conservation easement that would ensure the protection of open space, as well as of natural and cultural resources. Properties without grazing privileges in this area could be protected through conservation easements. Congressional appropriations to purchase conservation easements would be recommended under this option. Other tools such as tax incentives or amendments to current tax laws to provide capital gains or estate tax credit in conjunction with conservation easements would also be recommended.

South Park

No actions would be taken to protect study area lands within South Park. Permits that are associated with this land would be discontinued and the amount of grazing on assigned allotments (Gros Ventre, West Elk Ranch, East Elk Ranch, and Uhl Hill pastures) associated with this land would decrease. If study area lands within South Park were developed, any development would be subject to Teton County's scenic resource and natural resource overlay districts. Regardless of the density, any development proposal would require an environmental

analysis showing compliance with these overlay districts. Development densities would be the same as those described for option 1 (up to one dwelling unit per 35 acres without a county subdivision review; an average density of approximately one dwelling unit per 2 acres if county PRD standards were applied, a development plan was submitted, and critical wildlife habitat and scenic viewsheds were protected as open space). If this area was annexed by the town of Jackson, densities could be higher than those allowed by the county.

Option 3b: Protect Open Space by Reallocating Existing Grazing Permits and Other Methods

Park grazing privileges for study area lands, as provided through PL 105-81, would be continued. Grazing privileges and AUMs allocated to permittees in South Park would be terminated, and those AUMs would be reallocated to permittees in Spring Gulch. The overall number of AUMs would not exceed current levels. The establishment or continuation of grazing privileges would not exceed 25 years and would be contingent on the owner placing all of these properties in conservation easements. As described for option 3a, congressional appropriations to purchase conservation easements would be recommended. Other tools such as tax incentives or amendments to current tax laws to provide capital gains or estate tax credit in conjunction with conservation easements would also be recommended.

Spring Gulch

Study area lands without grazing privileges in this area would be assigned existing AUMs that would be transferred from ranch lands in South Park.

South Park

No actions would be taken to protect study area lands within South Park. Grazing permits that were associated with ranches in South Park would be terminated, and the existing amount of grazing on assigned allotments in the Gros Ventre, West Elk Ranch, East Elk Ranch, and Uhl Hill pastures would be reallocated to ranches in Spring Gulch. If study area lands in South Park were developed, any development proposal would require an environmental analysis showing compliance with Teton County's scenic resource and natural resource overlay districts. Development densities would be the same as those described for option 1 (up to one dwelling unit per 35 acres without a county subdivision review; an average density of approximately one dwelling unit per 2 acres if county PRD standards were applied, a development plan was submitted, and critical wildlife habitat and scenic viewsheds were protected as open space). If this area was annexed by the town of Jackson, densities could be higher than those allowed by the county.

OPTION 4. PROTECT ALL PRIVATE STUDY AREA LANDS, BUT DISCONTINUE PARK GRAZING PERMITS

All park grazing privileges associated with study area lands outside the park would be terminated, and all study area lands outside the park would be protected through the acquisition of conservation easements to ensure the protection of open space, as well as natural and cultural resources. As described for options 3a and 3 b, congressional appropriations to purchase conservation easements would be recommended. Other tools such as tax incentives or amendments to current tax laws that provide capital gains or estate tax credit in conjunction with a conservation easement would also be recommended. A management plan would be developed to restore native plant communities on study area lands within the park that would not be used for grazing.

OPTIONS CONSIDERED BUT DISMISSED FROM DETAILED ANALYSIS

NPS Boundary Expansion through Acquisition

Congress established criteria for the National Park Service to evaluate any proposed changes to the existing boundaries of individual park units in PL 101-628. These criteria include an analysis of whether the existing boundary provides for the adequate protection of natural, historic, cultural, scenic, and recreational resources. The criteria also require analysis if the lands in question

include significant resources or opportunities for public enjoyment that are “integral” to the existing park unit and are needed to fully carry out the purposes of the park as established by Congress. The National Park Service must also consider if the added lands would be feasible to administer given the size, configuration, ownership, costs, and other factors. Due to the size, location, potential costs of fee-simple purchase of study area lands, and other factors, the National Park Service believes that a boundary expansion to include the study area lands is not feasible. Therefore, this option was dismissed from further analysis.

Protect Open Space within and outside Park Boundaries; Eliminate All Grazing on Park Lands

Some individuals expressed concern about continued grazing within park boundaries. They felt that grazing on park lands is incompatible with park values and that it negatively impacts park resources. Therefore, grazing should be eliminated, and open space should be protected in ways other than through continued grazing. After assessing this option, the National Park Service dismissed it since it is outside the scope of this study. PL 105-81 does not extend or affect grazing privileges for ranches inside park boundaries (the Pinto, Moosehead, and Teton Valley Ranches). Therefore, the National Park Service does not have the authority to eliminate grazing privileges on these lands as a result of this study.

EXISTING CONDITIONS

This section describes existing conditions for the study area. The description is intended to present only the information necessary to understand the analysis of the options that are presented in the next chapter, and to meet the study requirements in PL 105-81. The area that could potentially be affected varies by topic; however, this section is generally organized to describe the existing conditions in the following manner:

Study Area Lands within the Park
- Northern Pastures
  - East Elk
  - West Elk
  - Uhl Hill
- Southern Pastures
  - Gros Ventre North
  - Gros Ventre South

Study Area Lands outside the Park
- Spring Gulch
  - Lazy Double AA Ranch
  - Box L Ranch
  - Mead Ranch
  - Hansen Ranch
- South Park
  - Jackson Hole Hereford Ranch

TOPICS DESCRIBED AND ANALYZED

The following topics are discussed in this report: cultural resources (including archeological resources), watersheds and wetlands; vegetation, wildlife and fisheries, (including endangered, threatened, or sensitive species), air quality, scenic views, land uses, economic conditions, and visitor experience and recreation.

TOPICS ELIMINATED FROM ANALYSIS

The following topics were considered and eliminated from further analysis for the reasons stated below.

Prime Agricultural Lands — The Farmland Protection Policy Act (7 USC 4201 et seq.) and the U.S. Department of the Interior ("Environmental Statement Memorandum No. ESM94-7") require an evaluation of impacts on prime or unique agricultural lands. No designated prime or unique agricultural lands exist in the study area (per Randy Williams, Jackson Field Office, Natural Resources Conservation Service).

Wilderness — There is no congressionally designated wilderness in Grand Teton National Park. Much of the Teton Range lies in recommended wilderness and is managed as such. An additional 41,700 acres in four blocks have been identified as potential wilderness additions. None of the study area lands within the park have been designated as potential wilderness. For the most part, potential wilderness areas cannot be seen from private lands within the study area.

Wild and Scenic Rivers — There are no existing or proposed wild or scenic river corridors within the study area. The primary river corridor in the park, the Snake River, is controlled at the outlet of Jackson Lake. While the corridor itself is well protected, the river is not eligible to be included in the system. The numerous tributaries to the Snake River within the park have not been evaluated for eligibility for inclusion.

CULTURAL RESOURCES

Study Area Lands within the Park

Archeological Resources

According to park cultural resource inventory maps, large parcels in the northern and southern pastures have been inventoried, but probably not intensively. These inventories were conducted decades ago and do not meet modern cultural resource survey standards, and survey reports have not been found. Very few recorded sites occur in these areas, possibly because of the survey strategy used at that time, the fact that the archeologists did not record all the sites they found, or the site density in these areas actually is low. Two more recent archeological surveys, one in each grazing area, did not locate many sites. Because of the lack of intensive archeological survey and site documentation, prehistoric land use patterns in these study areas (and

in Grand Teton National Park in general) are not well known.

Northern Pastures — Eleven prehistoric sites were recorded in the northern pastures. Six sites were determined to be not eligible for the National Register of Historic Places, while five have not been evaluated for eligibility. Unevaluated sites are afforded the same protection as evaluated sites found to be eligible because they may contain valuable data. Six sites consist of fire hearths with associated fire-affected rock; three are lithic scatters; one is a stone circle, and one has a fire hearth, fire-affected rock, and a stone circle.

Southern Pastures — There are 27 known archeological sites within the southern study area, most of which are concentrated within one particular grazing allotment. Twelve have been evaluated as eligible for the National Register of Historic Places; six sites were determined to be not eligible; and nine sites have not been evaluated. Nine sites in this study area are lithic scatters; seven are open camps indicating some sort of occupation, three are quarries for lithic materials; two are stone circles; two are hearths with fire-affected rock; and four have multiple components (various combinations of lithic scatters, ground stone, hearths, and open camps).

Native American Cultures and Present Use

Archeological and ethnographic sources indicate Native American cultures used the Jackson Hole area, including the park, as long as 8,000 to 10,000 years ago. General issues of concern include significant archeological sites, graves, and traditional cultural properties. While archeological and historic preservation law addresses archeological property concerns, these laws do not adequately protect or address other cultural values or traditions held in modern times. The American Indian Religious Freedom Act of 1978 and the Native American Graves Protection and Repatriation Act of 1990 defined and strengthened the rights of Native Americans and clarified the responsibilities of federal agencies regarding these kinds of cultural resources. The park is required to further identify and address Native American concerns through consultation with individual tribal governments

Historic Structures and Cultural Landscapes

National Register Criteria — The standard measures for assessing the historical significance of buildings, structures, and landscapes (whether they are in rural or urban areas) are established by the National Register of Historic Places. The national register has four criteria by which to evaluate historic properties:

- *Criterion A:* The property is associated with events that have made a significant contribution to the broad patterns of our history. In the case of Jackson Hole, this association could be with historic events such as the development of cattle ranching, and how this activity affected the growth and character of the larger community.
- *Criterion B* — The property is associated with the lives of persons significant in our past. This association can be with people of local or national importance.
- *Criterion C* — The property embodies the distinctive characteristics of a type, period, or method of construction, or it represents the work of a master, or it possesses high artistic values. Under this category a ranching complex made up of a residence, barns, agricultural buildings, corrals, and fences could be eligible to the national register if it represented a distinctive “type, period, or method of construction,” such as early 20th century ranching in the high plains.
- *Criterion D* — The property has the potential to provide important information about prehistory or history. This criterion applies specifically to archeological sites.

Historic Properties in the Park — Most of the historic resources within the study area (buildings, structures, and landscapes) are associated with the history of cattle ranching in the Jackson Hole area. One of the most significant themes in the valley’s history, cattle ranching was an important economic and societal force in the area’s early Euro-American history. The cattle industry anchored early settlement in the valley, supported the local communities, and shaped the area’s social structure. The concerns of local ranchers, particularly those related to grazing, affected federal conservation efforts in the area and would ultimately shape the legislation that created Grand Teton National Park. Cattle

ranching remained the economic mainstay of Jackson Hole through World War II, at which point tourism became more dominant. But, as Grand Teton National Park historian John Daugherty has observed, "the rancher and cowpuncher left a tradition that continues to be an important element of Jackson's self-image" (NPS 1999a).

Cattle arrived in the valley with Jackson Hole's earliest Euro-American settlers. When William Simpson entered the valley in 1883, he reported seeing approximately 100 cattle. The 1890s witnessed more families moving into Jackson Hole, attracted by the native wild grasses that could support livestock. By 1900 the cattle population was more than 1,000. Ten years later, 61 Jackson Hole ranchers were members of the Wyoming Stock Growers Association and reported owning over 10,000 cattle — a figure that may have been exaggerated, but that reflects the rapid rise of the cattle industry. Those numbers continued to increase into the 1930s, surviving, although barely, the depressions after World War I, when agricultural prices plummeted as demand declined, and the collapse of the stock market in 1929. The number of ranches in Jackson Hole also began to decrease in the 1930s as the Snake River Land Company began to buy ranch land (NPS 1999a).

The properties within the study areas reflect both the large and small historic ranching operations in Jackson Hole. Many of the larger concerns, such as the Jackson Hole Hereford Ranch, were created during the 1920s and 1930s through the consolidation of smaller farms and ranches. Most local ranches, however, were small, like those along Mormon Row, now within Grand Teton National Park. At the turn of the century most ranchers owned herds of less than 10 cattle; only about 3% had more than 100 cattle. The smaller ranches were often indistinguishable from a farm, as their owners also had gardens and raised dairy cows and cash crops. But virtually all ranchers, large or small, also raised hay, which was integral to cattle operations. The harsh environment of the northern high plains prohibits year-round grazing of cattle on rangelands, as the disastrous winter of 1886–87 made clear, when nearly half the cattle on the high plains died.

Northern Pastures — Prior to 1955 Jackson Hole ranchers grazed their cattle on land in the Pot Holes area of Grand Teton National Park, the area south of Moran Junction and west of the Snake River. Following construction of the new Jackson Lake Lodge, however, those grazing privileges were relocated to the east side of the Snake River, in the area now known as the northern pastures (Teton County Historical Society c. 1971). Historically, the northern pastures were considered to be some of the best agricultural land in the Jackson Hole valley, evidenced by the fact that this was one of the first areas of settlement. Today, the only physical remains of the many ranches that were once in this area are those of the Emile Wolff Ranch and the Elk Ranch. The Wolff Ranch building complex is in the southern portion of the East Elk pasture. The Elk Ranch building complex is in the northern portion of the East Elk pasture, although the historic ranch operations extended over a much larger area.

Emile Wolff Jr. Guest Ranch — This property is historically associated with the family of Emile Wolff, who settled in Jackson Hole c. 1887. Wolff established a cattle ranch in this area about 1895 and was one of the first homesteaders in Jackson Hole, and one of a number of ranchers to raise cattle on land within what is now Grand Teton National Park. Wolff patented this homestead property in 1906 and proved up on it in 1909. He also worked as one of the area's first forest rangers (Cassity n.d.).

The present ranch complex was constructed in 1942 by Emile and Marie Wolffs' son, Emile Jr., better known as "Stippy," and it is significant for its associations with the early settlement of Jackson Hole and the development of local tourism. The land upon which the ranch building complex sits is part of the original 160-acre Wolff homestead. Stippy and his wife Beryl operated the complex as a commercial tourist operation instead of a working ranch. In 1978 the Wolffs sold their ranch to the federal government with the provision of a reserved estate on the property until December 1999. Stippy died in 1988, and Beryl in January 2000, when the property was transferred to the National Park Service.

The Wolff Ranch complex encompasses nine buildings and structures. These include a main residence, a second residence (approximately 300 yards from the main residence), a garage, two cabins, a shed that may also have been used as a dwelling, a metal utility building, and

two small wooden storage sheds. The property has been officially determined eligible for listing on the National Register of Historic Places as being locally significant under criterion A (Cassity n.d.).

Elk Ranch — The Elk Ranch was reportedly once the "largest cattle ranch combination to ever operate in Jackson Hole." From 1915 to 1920, D. E. Skinner and Jude V. Allen ran the Elk Ranch in conjunction with the adjacent Hatchet Ranch. At its peak in 1919 the ranch covered over 1,700 acres and supported over 2,000 head of cattle. In 1920 the property was purchased by "Si" Ferrin, who sold it eight years later to the Snake River Land Company. The Snake River Land Company operated it as a hay ranch in support of the Jackson Hole elk herd, leased grazing land to local ranchers, and used the ranch as a winter pasture for horses and mules associated with the original Jackson Lake Lodge at nearby Moran. As part of this large operation, the Snake River Land Company also constructed the Uhl dam and reservoir, as well as an extensive irrigation system. The irrigation system is still extant and reportedly contains over 100 headgates (Mehls 1987).

The Elk Ranch building complex includes three bunkhouses, a cattle barn/corral system, a machine shop, a machine shed, and a spring-house. There is no formal determination of national register eligibility regarding Elk Ranch. The Elk Ranch building complex was surveyed in 1995 by Historical Research Associates, who concluded that the building complex was eligible for listing on the National Register of Historic Places. However, the surveyors also recommended that the National Park Service undertake a more extensive survey of all Elk Ranch lands to identify the larger cultural landscape of the ranch, which may also be eligible for the national register. That more extensive survey has not yet been completed (Historical Research Associates 1995).

Southern Pastures

The north Gros Ventre and the south Gros Ventre pastures are east of the Snake River and north of the Gros Ventre River to Antelope Flats. Similar to the northern pastures, this area was considered to contain some of the valley's better agricultural land and was one of the earliest areas of homestead settlement (NPS 1999a). Numerous homesteads were filed in this area; the earliest patents were filed in the 1890s; the latest in the 1920s.

Mormon Row Historic District — Today, the primary evidence of this area's agricultural history can be seen within the Mormon Row Historic District, located in the north Gros Ventre pasture. Mormon Row was listed on the National Register of Historic Places in 1997 and is an excellent representation of agricultural settlement on the high plains. The district, which has a state level of significance, is also important for its associations with Mormon culture. Beginning in the 1890s homesteaders eked out a living on the high arid plains of Jackson Hole by practicing a combination of dryland and irrigated farming that included raising dairy cows, beef, pigs, and chickens that served as the area's primary cash crops. The spring range for these cattle operations was in Antelope Flats (Huber et al. 1997).

Part of what once was a much larger community, Mormon Row is now defined by the remains of six homesteads that line the old Jackson-to-Moran road. The district includes 43 buildings and structures dating from the homestead period. The district boundaries also encompass the broader cultural landscape of the historic district, including fence lines, fields, and ditches within the north Gros Ventre pasture (NPS 1999b).

Study Area Lands outside the Park

Archeological Resources

Three known prehistoric sites exist within the study area outside Grand Teton National Park. All are in the South Park area south of Jackson. Two sites are eligible for listing on the National Register of Historic Places. One is a fire hearth with associated fire-affected rock and the other is a lithic scatter, indicating some kind of tool manufacture or reduction site. The third site, also a fire hearth with associated fire-affected rock, is not eligible for the national register. No known prehistoric cultural sites have been recorded in the Spring Gulch area. Minimal archeological survey work has been done in both these areas, and other prehistoric sites may exist.

Cultural Landscapes and Historic Structures

Five ranches are included in areas outside park boundaries. Four of the ranches — the Cliff Hansen Ranch, the Mary Mead Ranch, the Box L Ranch, and the Lazy Double A Ranch — are in Spring Gulch. These four ranches, which comprise a contiguous piece of property, are all east of the Snake River below its intersection with the Gros Ventre River. The fifth ranch — the Jackson Hole Hereford Ranch — is in South Park, south of the town of Jackson.

The four Spring Gulch ranches are excellent representations of the history and architecture of mountain valley ranching in the Jackson Hole area. All are working cattle ranches, and each includes buildings, structures, and cultural landscapes that retain a high level of historical integrity. The Spring Gulch ranches, which were founded by some of the valley's first settlers, are a living link to the area's historic past. The ranches are also remarkable for being owned and operated by families that have connections to the history of Grand Teton National Park.

Cliff Hansen Ranch — The Cliff Hansen Ranch is comprised of two building complexes: the original Hansen Ranch and the "lower ranch." According to historian Michael Cassity, the Cliff Hansen Ranch is "one of the most important ranches in Jackson Hole" because of its history and association with U.S. Senator Cliff Hansen, one of state's foremost political leaders (Cassity 1998). The property is also associated with the early settlement of Jackson Hole, the development of the regional cattle industry, and the controversy surrounding the expansion of Jackson Hole National Monument.

The Hansen Ranch was first established c. 1894 by William P. Redmond. In 1916 Redmond divided and sold his land, selling the northern part to Peter C. Hansen and the (southern) lower ranch to Bert Charter. Over the years, the lower ranch gained some notoriety for its possible connection with western outlaw Butch Cassidy. Charter raised registered Herefords and sold the property to Major C.C. Mosely. Between 1942 and1948 Mosely built most of the historic structures now extant on the ranch. Soon thereafter, he sold the property to Peter Hansen. Hansen and his wife Sylvia eventually developed their property into one of the largest cattle ranches in the valley. Upon Peter Hansen's death in 1952, his son Cliff took over the ranch (Cassity 1998).

Cliff Hansen was elected Teton County commissioner in 1942 and served as Wyoming governor (1963–67) and U.S. senator (1967–79). Hansen was one of the most vocal critics of the expansion of Jackson Hole National Monument during the 1940s, and he lobbied to ensure that an expanded park would protect cattle interests and would include grazing privileges for local ranchers. But, according to historian Robert Righter, Hansen's attitudes changed over time, and he eventually accepted the necessity of an enlarged national park (Righter 1982). Upon the expansion of the national park, grazing rights were issued to the Hansen family. Although the Hansen Ranch's grazing rights expired with Mead's death in 1996, they were extended through PL 105-81.

There are 14 historic buildings and structures on the Hansen Ranch. The original ranch, which is the more northern complex, includes a 2½-story log barn (c. 1894) built by William Redmond, a 2-story log barn (moved to this location in 1937), a summer kitchen built by Peter Hansen (1927), a house (1920); a log storage building (date unknown), a log residence (1927), and a storage building (date unknown). The lower ranch also has seven historic buildings and structures, many of which date to the Mosely era. These include a 1-story log cook house (c.1942–48), a 1-story log bunkhouse (c. 1942–48), a log utility shed (which may have been moved to the site), a log machine/vehicle shed (c. 1942–48), a log utility work building (c. 1942–48), a board-and-batten work shed (pre-1916), and a hay stacker (pre-World War II; Cassity 1998).

The Wyoming historic site inventory form for the Hansen Ranch (48TE1026) indicates that the historic buildings and the surrounding landscape have a high level of integrity. Although there is no official determination of eligibility, the ranch is probably eligible for listing on the National Register of Historic Places and would be significant at the local and state levels under criteria A, B, and C (Cassity 1998).

Mary Mead Ranch — The Mary Mead Ranch, also known as the Lower Bar BC Ranch, is at the northern end of Spring Gulch. The property is bound on the north by the Gros Ventre River, and on the east, south, and west by land belonging to the Lucas and Walton families

(Grand Teton National Park Open Space Work Group 2000). The Mead Ranch is associated with the early settlement of Jackson Hole, the development of the dude ranching and regional cattle industries, and the controversy surrounding the park expansion. The Mead Ranch is also significant for its associations with the Hansen family.

The Mead Ranch was homesteaded in 1895 by John C. Anderson. In 1916 Anderson sold the ranch to Struthers Burt and Horace Carncross. Burt and Carncross used the property to raise cattle and hay to support their dude-ranching operations. Sometime before 1927 the property was sold to Billy Francis, and all of the ranch buildings were destroyed in the 1927 Gros Ventre flood. Francis was the brother-in-law of Cliff Hansen, and the property eventually became part of the Hansen Ranch operation (Cassity 1998), and then Mary Mead, with grazing rights assigned to Mary Mead and extended through PL 105-81.

Historic buildings and structures at the Mead Ranch include the main house (1927), a log cabin (date unknown), a barn (1927) that is nearly four stories high and may be the largest barn in the valley, a bunkhouse (1927), and the foundation of the Billy Francis home. The Wyoming historic site inventory form (48TE1474) indicates that the buildings and surrounding landscape have a high level of integrity. Although there is no official determination of eligibility, the ranch may be eligible for listing on the National Register of Historic Places as locally significant under criteria A and C (Cassity 1998).

Box L Ranch — The Box L Ranch, in the heart of Spring Gulch, is also associated with the early settlement of Jackson Hole and the development of the regional cattle industry. The Box L Ranch "contains a complex of buildings that individually and collectively reveal the broad patterns of settlement and ranch development characteristic of this valley" (Cassity 1998). Passed down from generation to generation, the ranch has been operated by the same family for over three generations, a land pattern that was repeated through much of the valley's history (Cassity 1998).

The Box L Ranch was established by Lee Lucas, who came to Jackson Hole in 1896 and built the homestead cabin that still stands on the property the following year. By the 1930s Lucas and his wife Eva had expanded their holdings to include a herd of 450 Herefords and 50 horses (Cassity 1998; NPS 1999a). Lucas built many of the buildings remaining at the site; he also moved in other buildings from other historic ranches throughout the valley, a trend that occurred throughout Jackson Hole as the number of ranches declined and buildings were vacated (Cassity 1998). Following Lee's death, the property passed to his son Rod, whose son Lee continues to live on the property. (Phil Lucas, another son, purchased the adjacent Lazy Double A Ranch.)

Historic buildings and structures on the Box L Ranch include Lee Lucas's homestead cabin (1896); a log bunkhouse (moved from another location); a chicken coop (c. 1929); a large horse barn (c. 1929); a two-story log barn with gambrel roof (moved from another location); the main house (c. 1928); a log residence (moved from another location); and several fences and corrals. The Wyoming historic site inventory form (48TE1473) indicates that the buildings and the surrounding landscape have a high level of integrity. While there has been no official determination of eligibility, the ranch is probably eligible for listing on the National Register of Historic Places as locally significant under criteria A and C (Cassity 1998).

Lazy Double A Ranch — The Lazy Double A Ranch, at the northeastern end of Spring Gulch, also reflects early settlement in Jackson Hole and the development of the regional cattle industry. In addition, the ranch's buildings and structures (which include a hay slide, weigh shed, and generator building) exemplify the changing technology of ranching in Jackson Hole, including the evolution from horsepower and candlelight to the internal combustion engine and electricity. Comprised of various properties acquired over time, the Lazy Double A also reflects changing landownership patterns in the county. The ranch is an excellent representation of the social and economic history of ranching in 20th century Jackson Hole (Cassity 1998).

Phil Lucas, the son of Lee Lucas (who established the adjacent Box L Ranch), acquired the Lazy Double A Ranch in 1947. The ranch now encompasses lands that were owned variously by John Cherry, one of the first settlers in Jackson Hole; Harvey Glidden, a prominent attorney and rancher; Major C. C. Mosely, a World War I combat aviator; and Billy Francis, whose original

buildings on the site were destroyed in the 1927 Gros Ventre flood. Since Phil Lucas's death in 1996, the family has continued to operate the ranch (NPS 1999a; Cassity 1998).

Historic buildings and structures at the Lazy Double A Ranch include a cabin/studio (moved to this location); a cabin (moved from the 3 Bar H Ranch); a generator house (c. 1915); a bunkhouse that may have been moved from the John Cherry homestead (c. 1887); a barn (1950); a log barn (moved to this location); weigh shed (post-1950); a barn (1965); a granary (c. 1940s); a shop (date of construction unknown); and a hay stacker (pre-1939).

The Lazy Double A Ranch also includes two isolated historic properties: the John Cherry homestead cabin (1887) and the Fern and Albert Nelson cabin (c. 1930). John Cherry established a 160-acre homestead in Spring Gulch in 1887. Cherry ranched and guided dudes in Jackson Hole until he left the valley around 1917 (NPS 1999a; Cassity 1998).

The Lazy Double A Ranch buildings were surveyed by Michael Cassity in 1998. The Wyoming historic site inventory form (48TE1472) indicates that the buildings and surrounding landscape have a high level of integrity, and the buildings are probably eligible for listing on the National Register of Historic Places as locally significant under criteria A and C (Cassity 1998).

WATERSHED AND WETLAND CONDITIONS

Study Area Lands within the Park

Water is diverted from the Gros Ventre River in the town of Kelly through a ditch system that delivers stock water to the southern pastures approximately 2 miles away. This ditch has not been maintained, and in order to deliver sufficient water to the pasture for livestock it is necessary to divert an estimated 20–30 cubic feet per second (cfs) at the point of diversion. The lack of maintenance and trampling of ditches by livestock have resulted in increased noxious weed problems, mostly musk thistle.

The trampling of ditch banks and the introduction of noxious weeds are also evident in the southern pastures, where stock water from the Kelly Warm springs is diverted to the pasture area along Mormon Row. On the north end a similar problem exists. The northwestern portion of the north Gros Ventre pasture had natural wetlands that are reported to have had significant waterfowl use in early days. It is unknown if these wetlands disappeared as a result of drainage for agriculture or down cutting of existing waterways.

The East Elk Ranch is irrigated by water diverted from Spread Creek, and in most years Spread Creek is effectively dewatered by this diversion by late summer and fall. Measurements in September 2000 indicated that up to 40 cfs are diverted for irrigation. Wyoming water law allows the use of one cfs per 70 acres. About 1,000 acres at the East Elk Ranch are irrigated, so there may be non-compliance with Wyoming law. It is necessary to divert a large amount of water as the irrigation system in the fields has deteriorated badly, resulting in headcutting of some ditches that are now several feet deep. Irrigators must maintain a large head of water to push water over the area to be irrigated. This large amount of water ultimately results in a constant return flow of irrigation water into the Snake River from the pastures. Water samples were taken in 2000 to determine the amount of fecal coliform that is contained in the return water, but this data are not yet available.

National wetland inventory maps indicate significant amounts of wetlands in the irrigated pastures. While naturally occurring wetlands most certainly occur, as well, it is unknown if irrigation practices may have altered these areas. Aerial photographs indicate a ditch pattern in the southwestern portion of the pasture that is more indicative of drainage ditches than irrigation ditches.

In the north Gros Ventre pastures some irrigation ditches divert water from Ditch Creek, which bisects the north end of this pasture. During high water this causes additional sheet and headcut erosion. Aggradation of bedload moving down the creek during high water compounds this problem.

Study Area Lands outside the Park

Private lands within the study area outside Grand Teton National Park include irrigated farmland, riparian pasture, and non-irrigated

rangeland. Irrigated farmland comprises the bulk of the private land. These lands are used primarily for hay production and pasture. The national wetland inventory maps indicate significant amounts of wetlands interspersed in these lands. A wetland delineation is not known to exist, so the impact of subdivision plans on wetlands is unknown, but it seems likely that the degree of interspersed wetlands would dictate where homes and other developments could be placed.

The Gros Ventre River lies along the northern border of the Spring Gulch lands. The riparian area is primarily mature cottonwood. Cottonwood regeneration is not occurring at replacement rates, perhaps due to the presence of a dike to prevent flooding. There are spring creeks in this area that provide spawning for cutthroat trout.

VEGETATION CONDITION AND USE

Study Area Lands within the Park

Many of the park's Natural Environment (class III) lands identified in the Grand Teton *Master Plan* have a past of heavy use by humans. As such, existing plant communities are significantly different than what they would have been without human activities. Livestock grazing, irrigation, plowing and planting with annual crops and domestic grasses dramatically changed native plant communities throughout much of Grand Teton National Park, including livestock allotments. Beetle (1968) described vegetation in Teton County as still developing and identified control of fire and supplemental feeding of elk as the two primary disturbances affecting vegetation.

Much of the area within livestock allotments was homesteaded in the late 19th and early 20th centuries. Homesteaders introduced domestic grasses such as timothy and brome in the 1890s (NPS 1999a). The areas that were farmed and irrigated the longest show little recovery of native species and are the sites of some of the largest noxious weed infestations in the park. Dams and the resulting controls on flood events has altered succession pathways in riparian zones. Wildfire control has increased density of sage in upland areas, and may have contributed to the decline of aspen.

Currently the park has a prescribed fire plan with one of the objectives to restore natural processes. Portions of the Uhl Hill and Spread Creek pastures were burned in the spring of 1997, and in the spring of 1998 additional portions of the Uhl Hill allotment were burned. Approximately the northern third of the South Gros Ventre pasture was burned in May 1999. Areas within allotments that are currently planned for prescribed fire include the remainder of the South Gros Ventre pasture and the area known as Wolff Ridge in the East Elk Ranch Pasture.

Ute ladies'-tresses *(Spiranthes diluvialis),* a plant species on the federal threatened list, is in the orchid family and is not known to occur in the park (Shaw 1992; S. Markow, Univ. of Wyoming, pers. comm.). Habitat consists of moist streambanks, wet meadows, and abandoned stream channels at 5,100–5,200 feet elevation. The low point of the valley is the town of Jackson, which is at 6,200 feet; this is higher than the usual habitat for this species. Nearest known locations are in southeastern Wyoming, northern and south-central Utah, and northern Colorado.

Northern Pastures

West Elk Pasture — The cover type for this pasture is sagebrush/grassland at the south end and formerly cultivated brome grass pasture at the north end. Musk thistle densities in this allotment are high in some areas. Wetlands near the south end of this pasture are heavily grazed by bison, horses, and cattle later in the summer and fall.

East Elk Pasture — Much of this allotment is irrigated grass meadow, but a portion of the glacial moraine commonly referred to as Wolff Ridge is included in this allotment. The north-facing slopes of Wolff Ridge are a mixed forest cover type with spruce/fir and aspen stands intermingled with sagebrush/grasslands. Within the irrigated grass pastures are interspersed wetlands, but these may largely be a result of long-term ponding of irrigation water in less permeable soils, such as the poorly drained Slocum soil. Domestic grasses are dominant on the irrigated fields, but desirable native species such as Nebraska sedge provide a significant amount of forage. Kentucky bluegrass, which is tolerant of sustained heavy grazing, now dominates many areas. Dandelion and white

clover are dense throughout the area. As the irrigation system has deteriorated, it has become impossible to get water to all sites. These unwatered sites are dominated by smooth brome and musk thistle. There are large stands of Canada thistle in the irrigated pastures, which are a result of soil compaction associated with grazing and irrigating at the same time.

Uhl Hill Pasture — There are a variety of cover types in this pasture, mostly sagebrush/grassland with interspersed spruce/fir and aspen forest types. Portions of this allotment were treated with prescribed fire in the springs of 1997 and 1998. There has been a large ungulate exclosure on this allotment for about 34 years. This allotment receives heavy elk and bison use, is elk winter range, and wintered bison in 1999 and 2000. Noxious weeds are primarily associated with disturbed sites such as roadsides and the Elk Ranch reservoir and dam, which was not seeded following construction. With the exception of flat and subirrigated areas, there is good quality native range vegetation on most of this pasture.

Lower Cunningham Pasture — The lower Cunningham pasture is included in the trailing route of the Mead/Jackson Hole Hereford Ranch herd. Portions of the pasture are irrigated by the Triangle-X Dude Ranch for horse pasture. Much of the pasture is sub-irrigated. Smith and Dodd (1997) had a study site in this area and found this site to have lower total standing crop and to be in lower successional status than similar sites. They attributed this to combined elk, cattle, bison, and horse grazing. The lower successional rating was due to relatively high amounts of bluegrass and forbs, but few shrubs. Almost all of this pasture is shown as being homesteaded (NPS 1999a), and an understanding of land-use and agronomic practices during the time it was homesteaded is probably critical to understanding the existing situation today. Unfortunately, that information is not available.

Moosehead Flats Pasture — This 1,500-acre pasture borders the Snake River on the west and is not separated from the West Elk by fencing. Spread Creek runs through the pasture. Smooth brome is the dominant grass throughout the site. Big sage has established on some of the brome grass areas and is very dense. There are significant cottonwood stands present along the Snake River and Spread Creek. Musk thistle, a noxious weed, is found throughout this pasture, usually on disturbed sites or old brome fields.

Southern Pastures

Gros Ventre North — This pasture consists of previously farmed and irrigated smooth brome grassland. Riparian vegetation consists of mature cottonwood trees only, so there is insufficient riparian vegetation to spread and slow flood water. The northeast portion of this pasture contains a small seasonal wetland.

Musk thistle, a noxious weed, is distributed throughout both pastures, with the densest populations occurring in areas previously cultivated where there is little plant biodiversity. Dalmation toadflax appears to be spreading in the south pasture, and sulfur cinquefoil was recently discovered in the north pasture.

Due to the heavy bison use and the lack of alternative pastures to use for cattle, Kentucky bluegrass is increasing. This has resulted in lower total forage production and exacerbates the problems associated with over use.

Gros Ventre South — The understory on this previously farmed pasture is dominated by smooth brome. Big sage, a native, has formed a dense overstory in most of these areas. Overall, there is low plant species diversity on this pasture.

The native range sites are in somewhat better condition. Smith et al. (1997) reported that a study site within the native plant communities in this pasture had 53% of the potential natural community. This compares favorably with other study sites, both grazed and ungrazed in the park.

Study Area Lands outside the Park

Non-irrigated rangeland is a mix primarily of aspen and sage/grassland habitat types. These lands are generally steep hillsides that have limited development potential. Most adjacent lands of a similar nature have already been developed to the extent possible or are protected by conservation easements.

Little is known about noxious weeds on private lands outside the park; however, musk thistle and spotted knapweed are known to exist in the Gros Ventre River riparian area.

Ute ladies'-tresses (a threatened species) is not known to occur near the park. The elevation of the study area is higher than the usual habitat for this species.

WILDLIFE HABITAT

Study Area Lands within the Park

Grand Teton National Park provides habitat for 55 species of mammals, 4 reptiles, 5 amphibians, 16 fish, and over 300 species of birds. The grazing allotments provide habitat for many of these species on at least a seasonal basis. Wildlife species found on the grazing pastures include ungulates (elk, moose, bison, mule deer, antelope), large carnivores (black and grizzly bears, gray wolves, mountain lions), rodents (mice, voles, ground squirrels, gophers), numerous species of birds (including bald and golden eagles, sage grouse, passerines, long-billed curlews, trumpeter swans), and amphibians (chorus and spotted frogs, boreal toads).

One aspect of cattle grazing in the park that should be mentioned in terms of effects on wildlife species is fencing. Fences are often impediments to wildlife movements, can cause mothers and young to become separated, and can cause injuries and sometimes deaths. Pronghorn antelope are a species known to be particularly affected by fencing. This problem can sometimes be alleviated through the use of "wildlife-friendly" fencing, with elements such as clearly visible top rails and numerous gates.

Five vertebrates species that use the park year-round or seasonally are listed as threatened, endangered, experimental, or proposed (U.S. Fish and Wildlife Service [USFWS] 2000). These species are discussed below.

Large Ungulates

Elk — Elk *(Cervus canadensis)* are common on the grazing pastures. The northern pastures are used throughout the year; in particular, Uhl Hill and Spread Creek represent important calving areas and winter range. Moosehead Flats also provides significant winter range. Peak calving occurs in June, prior to the appearance of cattle on these pastures. Calving usually takes place in tall sagebrush or open timber.

Depending on the severity of winters, as many as 700 elk may winter in the northern pastures. Blacktail Butte, abutting the Gros Ventre (southern) pastures, provides winter range to a small number of elk. In early summer elk use the Elk Ranch pastures extensively. They forage there at night and move to nearby timbered areas during the day. They tend to have left these pastures prior to the arrival of cattle and reduced local elk numbers as the summer progresses support the idea that elk are migrating to other summering areas.

During spring and fall migrations to and from the National Elk Refuge, both northern and southern pastures receive heavy use. As part of the park's enabling legislation, a public elk reduction is allowed in certain park areas to manage the Jackson elk herd. The elk reduction is scheduled to coincide with the fall migration, and usually takes place from mid-October to early December. During the reduction, the Pacific Creek, Uhl Hill, Spread Creek, and Gros Ventre pastures are open to hunting and receive considerable hunting pressure. The Gros Ventre pastures are primarily used as a migration corridor between Antelope Flats and the Snake River bottoms to the refuge, and elk do not spend much time there. They commonly travel at night.

Bison — Bison *(Bison bison)* primarily use the grazing pastures in spring, summer, and fall (Cain et al. 2000). The majority of the herd (approximately 560 animals) winter on the National Elk Refuge. In April they begin migrating northward, and a large percentage can be found on or near the Gros Ventre pastures until the following fall, when most return to the refuge. After the breeding period bison again are distributed widely and can often be found on the northern pastures. A large proportion, however, remain in or near the Gros Ventre pastures until the bison move south to the refuge, usually in December.

During the last two years increasing numbers of bison have wintered on the Uhl Hill and Spread Creek (northern) pastures. Prior to 1998 only 5–10 bison were located there during annual winter

bison classification surveys. Since then, numbers have increased to 60–100 bison. The increased use of the pastures is suspected to be due to increased bison numbers as well as increased forage from reduced domestic livestock grazing and a prescribed fire in the area during 1997.

Moose — Moose (*Alces alces)* are common throughout the park, and primarily use riparian areas and willow flats. In the winter they are found at lower elevations in the park where the snow is less deep and primarily browse on willow (*Salix* spp.) and bitterbrush (*Purshia tridentata*).

Moose occur in the northern grazing pastures. Winter wildlife surveys have documented up to 100 moose occupying the willow flats between Spread Creek and Deadmans Bar. Moose also concentrate in the sagebrush flats east of Blacktail Butte, where bitterbrush is common. Up to 50 moose can be found in this area during the winter.

Other Ungulates

Both pronghorn antelope (*Antilocapra americana)* and mule deer (*Odocoileus hemionus*) may be found in several of the pastures. Antelope primarily use open sagebrush/ grasslands and are common on or near the Gros Ventre pastures. They are sometimes seen in Spread Creek and the other northern pastures. Mule deer are relatively uncommon throughout the park; they are more likely to use study area pastures containing forested areas, such as Uhl Hill and Spread Creek.

Large Carnivores

Gray Wolf — The northern Rocky Mountain gray wolf *(Canis lupus)* was classified as endangered in this region. However, since its reintroduction into the Yellowstone area in March 1995, it has been reclassified by the U.S. Fish and Wildlife Service as a “non-essential, experimental” population. This designation allows the Fish and Wildlife Service to remove wolves that prey on domestic animals. Wolves from this experimental population established Grand Teton National Park as part of their home range during the 1998–99 winter season. Three groups have used areas within the park from Pacific Creek to the National Elk Refuge and the Gros Ventre River basin. There is no record of wolf depredation on livestock within park boundaries.

Northern Pastures. Wolves were recorded near the Wolff Ridge and Spread Creek areas throughout the winter of 1999. In April 1999 a pair of wolves denned within the Spread Creek grazing pasture and produced five pups.

Radio-telemetry locations revealed that the Teton pack used the Spread Creek and Uhl Hill grazing pastures extensively. In May the adults moved the pups to a new den site on the Uhl Hill pasture, and two more dens associated with rendezvous sites were dug, all on Uhl Hill. Adults were found on the East Elk pasture on three occasions, one of which occurred following the arrival of cattle. There was some use by the Teton pack of the northern pastures during July, August, and September 2000, ranging between Elk Ranch Reservoir and Signal Mountain.

The Gros Ventre pack has been in the Upper Gros Ventre basin, east of the National Elk Refuge but recently returned to the National Elk Refuge this past winter.

During 2000 no packs denned in the park. The Teton pack did not den, and the Gros Ventre pack denned in the Gros Ventre area, east of the park.

Southern Pastures. The Gros Ventre pack has been located immediately adjacent to the JY Ranch, the Gros Ventre pastures, and the Teton Valley Ranch pastures. The Teton Valley Ranch pastures are situated in an apparent travel corridor between the Gros Ventre River drainage (where the Gros Ventre pack has denned), and the elk refuge (where the pack has spent much of the two winters since arriving in Jackson Hole).

Grizzly Bear — While grizzly bears *(Ursus arctos horribilis)* are native to North America, in the contiguous United States, they were extirpated from about 98% of their historic range between 1850 and 1950 by human-caused mortality (Hall and Kelson 1959; USFWS 1993). The Greater Yellowstone Area provides habitat for one of the few remaining populations. Grizzly bears in this region were listed as threatened in 1975. Due to population growth in many areas, the U.S. Fish

and Wildlife Service is considering delisting the grizzly bear.

Since 1986 the management of the Yellowstone grizzly population has been shaped by the *Interagency Grizzly Bear Guidelines* (Interagency Grizzly Bear Committee 1986). The guidelines were developed in an effort to provide effective direction for the conservation of grizzly bears and their habitat among the federal agencies responsible for managing land within the recovery zone.

One of the most challenging and controversial aspects of grizzly bear conservation in the Yellowstone ecosystem has been management of the grizzly/livestock interface. Historically, predator control of carnivores was widespread (Anderson et al. 1997) and contributed significantly to the grizzly bear's decline throughout the western United States (Storer and Tevis 1955; Brown 1985). Currently, grizzly bear conflicts with livestock throughout the ecosystem have been managed according to the interagency guidelines, which include a protocol for nuisance bear management.

Grizzly bear management within Grand Teton National Park is governed by the park's *Human-Bear Management Plan* (NPS 1989) and the interagency guidelines. Specifically, the park's objectives for managing grizzly bears are to:

- restore and maintain the natural integrity, distribution, and behavior of grizzly bears
- provide for visitors to understand, observe, and appreciate grizzly bears
- provide for visitor safety by minimizing bear/human conflicts, by reducing human-generated food sources, and by regulating visitor distribution.

Approximately 125,000 acres of Grand Teton National Park lie within the grizzly bear recovery zone. On the Jackson Hole valley floor grizzlies are common north of the Triangle X Ranch and have been observed south of there in the Snake River drainage on several occasions. Home ranges of 27 radio-collared bears from 1975 to 1998 have included parts of Grand Teton and the John D. Rockefeller Jr. Memorial Parkway. Grizzly bear / human conflicts in the park have included human injuries and maulings, nuisance bears associated with unsecured human foods and garbage, and livestock depredations. The latter are predominantly depredations on calves.

Northern Pastures. Grizzly bears are common both within and adjacent to the northern grazing allotments. Home ranges of 20 bears collared from 1975 to 1998 have included portions of these allotments, and sightings of unmarked bears in the area are abundant. Sightings have included bears of various ages, as well as sows with cubs.

Grizzly bear / human conflicts in this area have been limited to livestock depredations. From 1994 to 1999, 41 incidents of livestock depredation were documented on the northern pastures. Confined to the Elk Ranch and Spread Creek areas, these depredations included 3 killed cows, 4 injured calves, and 34 killed calves. Through intensive monitoring, many of these cases were attributed to two adult males.

Southern Pastures. No verified sightings, relocation points of collared bears, or cattle depredations have occurred within the southern pastures. Bear habitat exists on all sides of these pastures, as evidenced by the common presence of black bears, especially on Blacktail Butte and on national forest lands to the east. Grizzly bears probably pass through the area occasionally and are becoming more common just east of this area in the Gros Ventre foothills in the Bridger-Teton National Forest. Because of the proximity of these pastures to grizzly bear habitat, there is potential for future cattle depredations. Associated development in the area, however, may result in this probability remaining low.

Canada Lynx — The Canada lynx *(Lynx canadensis)* is proposed for listing as a federal threatened and endangered species list. Little is known about the abundance and distribution of lynx in Grand Teton National Park; in coordination with other federal agencies, NPS staff will begin conducting surveys to detect lynx and protect them from human disturbance.

There are no known records of lynx in any of the grazing pastures. Most of the pastures consist of graminoid vegetation and do not constitute important habitat for lynx or prey species. The nearest lynx have been documented over 5 kilometers away (park wildlife observation database), although they could be expected to

occur in the forested sections of grazing pastures, specifically the north-facing slopes of Wolff Ridge, Uhl Hill, and throughout the Pacific Creek pasture.

Birds

Numerous species of passerines, including neotropical migrant species, and raptors can be found on the pastures. However, open pasturelands do not constitute high-quality habitat for most species. The more complex native sagebrush/grasslands provide important habitat for several species of sparrows, for example, Brewers *(Spizella breweri)* and sage *(Amphispiza belli).* They also provide cover for rodents, prey of predatory birds such as red-tailed hawks *(Buteo jamaicensis),* Swainson's hawks *(Buteo swainsoni),* prairie falcons *(Falco mexicanus),* kestrels *(Falco sparverius),* northern harriers *(Circus cyaneus),* and short-eared owls *(Asio flammeus)*.

Bald Eagle — The bald eagle *(Haliaeetus leucocephalus)* was federally listed as an endangered species in Wyoming in 1967 and was relisted in 1978. The Pacific States Bald Eagle Recovery Team was formed as a result of the 1978 listing, and a recovery plan was completed in 1986 (USFWS 1986). Bald eagles were down-listed to threatened in Wyoming in 1995, and in July 1999 a proposal to delist them was published in the *Federal Register.* No final action has occurred to date. Grand Teton National Park lies within the Greater Yellowstone Recovery Area (zone 18 in the recovery plan).

Bald eagle management in the park has and continues to revolve around conducting annual nest surveys, establishing seasonal area closures around bald eagle nest sites to provide protect them from human disturbance, and monitoring of annual nest territory occupancy and productivity. For at least the last 20 years, park staff have conducted a banding program for nestlings.

The study area contains little bald eagle habitat. Spread Creek, which runs east to west through the northern pastures, may be used occasionally for foraging but is of negligible importance in meeting food requirements. The Snake River, which is used extensively for foraging and nesting, runs adjacent to some of the northern pastures, but is unaffected by them. Eagles also use the Buffalo Fork River, which borders two northern pastures.

Although there are no nests on the pastures, bald eagles are commonly observed on or near the areas. Four bald eagle nest sites exist along the Snake River in the vicinity of several of the pastures. These sites range from 1 to 5.5 kilometers from the nearest allotment. Several pairs successfully reproduce annually in the park.

Whooping Crane — The American whooping crane *(Grus americana)* was previously listed as an endangered species but, with the reintroduction of the species to Yellowstone, it was reclassified as "experimental, non-essential." Whooping cranes primarily use marshes or riverine habitat for both foraging and roosting during migration (USFWS 1994). Only four confirmed sightings have been reported on any of the grazing pastures, and the last was in 1991 (park wildlife observation files).

Trumpeter Swans — Trumpeter swans (*Cygnus buccinator)* are of particular interest because there has been a long-term decline in the year-round resident tri-state flock subpopulation. A recent petition for listing them as threatened or endangered (Biodiversity Legal Foundation and Fund for Animals 2000; USFWS 2000) has been submitted. Overwinter survival has decreased because of suspected competition for marginal winter range with a migratory Canadian flock, and low recruitment is being investigated. Elk Ranch Reservoir in the northern pastures is a historic territory of trumpeter swans in the park.

Amphibians and Reptiles

The decline of amphibian populations has been documented worldwide and is thought to be particularly acute in western North America (Corn 1994). Although commonly associated with habitat degradation and loss, downward trends and disappearances also have been detected in natural areas believed to be unpolluted and relatively pristine (Patla and Peterson 1999).

The boreal toad (*Bufo boreas*), Columbia spotted frog (*Rana luteiventris*), boreal chorus frog (*Pseudacris triseriata*), northern leopard frog

(*Rana pipiens*), and tiger salamander (*Ambystoma tigrinum*) can be found in the park. Park staff began conducting annual amphibian surveys in 1990 to provide baseline data on species' distributions and demography. Although surveys have not included any of the grazing pastures, amphibians are expected to occur along some of the irrigation ditches, in riparian areas, and along the edges of the Elk Ranch Reservoir.

Four species of reptiles are present in the park — the wandering garter snake, valley garter snake, rubber boa, and northern sagebrush lizard. The wandering garter snake is widely distributed throughout lowland areas of the park and is the most abundant reptile in the park. The valley garter snake is widely distributed, but has decreased in abundance. Records do not show a wide distribution or occurrence rate for rubber boas. The northern sagebrush lizard has been confirmed to occur in the park, but little else is known about the occurrence or distribution of this species.

Study Area Lands outside the Park

Despite the presence of appropriate wildlife habitat on private properties near Grand Teton National Park, there is a basic conflict between elk and bison use of these areas and the presence of cattle on the ranches. Because of brucellosis, no mingling between these species and cattle is allowed, and Wyoming Game and Fish personnel are obligated to remove these wildlife species if they linger on the properties. Removal may mean physically moving them with helicopters or snowmobiles or destroying the animals involved.

Large Ungulates

Elk — Elk utilize agricultural areas as well as coniferous forests, aspen, shrublands, and grasslands. They are a common resident in Jackson Hole, most spending summers in more wooded areas outside developed areas, and thousands winter on the National Elk Refuge.

Approximately 50–100 elk winter on the portion of the Mead/Hansen Ranches, which border the Gros Ventre River and use it partly as a migration corridor. There have been conflicts because elk have eaten hay, and Wyoming Game and Fish personnel have been required to intervene. During February in both 1997 and 1999, 45 elk were hazed by helicopter across the Lazy Double A Ranch and east of the highway to the refuge. Farther to the southwest, 40–50 elk winter in the general area of the Box L Ranch and the lower Mead/Hansen Ranches, and calls are made every year regarding elk in the subdivision. Snowmobiles moved 400–600 elk to the South Park feed grounds during the winter of 1999/2000 from the Jackson Hole Hereford Ranch and west of the property. East of the ranch 20–50 elk winter on the hillsides between Snow King and Horsethief Canyon. They move west to feed on haystacks during bad winters. Some winters 25–30 elk may be found along the east side of East Gros Ventre Butte between the town and the fish hatchery. Herds may also winter on the north end of West Gros Ventre Butte and on the northern part of Boyle's Hill.

More than 200 elk regularly summer west of West Gros Ventre Butte (west of the lower Mead/Hansen Ranches), with movements toward the south and back again.

Migration routes follow a general pattern of summering elk moving in a south/southeast direction from Bridger-Teton National Forest lands across southern potions of the park toward the National Elk Refuge. They travel southward through the park to arrive at the wintering area at the northwest corner of the ranch study area (upper Mead/Hansen Ranches, western edge of Box L Ranch). Movement continues south along the western boundary of the lower Mead/Hansen Ranches. There is also movement from the northwest, crossing the Gros Ventre River corridor and the northern portion of the Lazy Double A Ranch. Southwest of West Gros Ventre Butte is another wintering area, reached from the national forest on the west. Migration routes continue in a southeasterly direction and also from west to east.

Elk also migrate from parts of the Bridger-Teton National Forest east of the Jackson Hole Hereford Ranch, moving from forested higher elevation areas toward the hillsides east and southeast of the ranch.

The only elk parturition area designated on a map is approximately 11 miles to the southeast of the Jackson Hole Hereford Ranch in Bridger-Teton National Forest.

Bison — Bison in the valley are not usually found in the ranch and agricultural areas adjacent to the park. One bison bull remained there for some time and, although scheduled for removal by the Wyoming Game and Fish Department, he moved east along the Gros Ventre River and died of natural causes. Bison can be found in the Snake River bottoms from Blacktail Ponds north but have not often ventured south along the river. Farther to the east the Kelly hayfields, Hunter-Talbot, and Antelope Flats areas are heavily used for grazing and during the breeding period. During the summer of 2000, due to prescribed fires in 1998 and 1999, bison also grazed near the south end of Blacktail Butte, an area in which they were rarely found previously. Bison remain east of the highway and primarily southeast of Blacktail Butte as they cross the Gros Ventre when they travel between park lands and the National Elk Refuge.

Moose — Moose prefer riparian areas and willow flats. In the study area they are most abundant along river drainages. In a 1.5 km section along the Gros Ventre River from the Spring Gulch bridge to the Gros Ventre Junction, there are regularly 5–10 moose (WG&F, D. Brimmeyer, pers. comm.). The Lazy Double A Ranch meets the river at the bridge, and its land runs along the Gros Ventre River to the west where it abuts the northern section of the Mead/Hansen Ranches. This property extends along the Gros Ventre to the west, includes the confluence area where the Gros Ventre River meets the Snake River, and continues southwest along the Snake. About 5–10 moose live on East Gros Ventre Butte.

Based on yearly survey flights, moose numbers along the Gros Ventre River north of the study area have varied from 10 in 1998 to 68 in 1992. It is difficult to estimate how many moose use the rivers along the northern borders of study area, but assuming at least 10 would be safe, taking into account the known numbers for the short stretch of river immediately east.

Migration occurs east of the Snake River along the Snake and Gros Ventre River corridors, with moose moving north and south between the Snake and U.S. Highway 89, and also from Bridger-Teton Nation Forest west of the Snake River from the northwest to the river.

Mule Deer — In all, there are a minimum of 500 wintering deer. Approximately 50 mule deer live on East Gros Ventre Butte. These can be found on Saddle Butte, southwest of the butte, and less than a mile north of Jackson Hole Hereford Ranch. Boyles Hill, a mile to the west, also harbors deer. Groups can often be seen on the hillsides west of the highway between the town of Jackson and the fish hatchery and have been about a mile northeast of the Lazy Double A Ranch, east of the highway in the more wooded Gros Ventre drainage.

From 50 to 100 deer use the slopes and forested hillsides from Snow King to Horsethief Canyon. The eastern border of the Jackson Hole Hereford Ranch includes part of this land. They also winter to the northeast on the southeastern edge of the National Elk Refuge and the adjoining Bridger-Teton National Forest.

Between 100 and 150 deer winter on private feed grounds north of the Gros Ventre River, west/northwest of the Jackson Hole Airport. These deer are considered to be “short stopping” and normally would move to the south without the temptation of a feed line.

Migration routes follow the Snake and Gros Ventre River corridors. Mule deer travel from Bridger-Teton National Forest west of the upper study area ranches and also from the national forest east of the Jackson Hole Hereford Ranch. There is movement between East and West Gros Ventre Buttes toward and away from Spring Creek. Deer travel from the southern end of East Gros Ventre Butte southeast toward forested hillsides south of town and also southwest toward Saddle Butte.

Pronghorn Antelope — Pronghorn may travel across the study area properties but are not commonly found there. They utilize basin/prairie and mountain/foothill shrublands, eastern Great Plains and Great Basin/foothills grasslands, and sagebrush/grasslands.

Large Carnivores

Black Bear — Black bear habitat includes coniferous forests, aspen, riparian shrub, and mountain/foothill grasslands. They are considered a common resident in western Wyoming and prefer forested areas outside the ranch and agricultural lands adjacent to the park. They have been noted on the western portion of the

West Gros Ventre Butte and at least once on the Mead Ranch. Forested habitat runs adjacent to the Snake River and is connected to the riparian corridor.

Grizzly Bear — Grizzly bear habitat exists on the sides of the ranch properties, as evidenced by the presence of black bears. Grizzly bears are now common in the Gros Ventre Buttes in the Bridger-Teton National Forest on the south-eastern border of Grand Teton National Park, and southeast to the upper Green River basin.

As grizzly bears become increasingly common and reestablish themselves in their historic range, they will probably pass near or through the ranches occasionally, and the potential for future bear/human conflicts and cattle depreda-tions exists. Associated development in the area, however, may result in this probability remaining low.

Gray Wolf — There have been no reports of wolves on ranches in the study area. They have been placed throughout the National Elk Refuge and in Bridger-Teton National Forest east of the refuge.

Canada Lynx — As previously stated, little is known about the abundance and distribution of lynx. Most of the study area lands do not constitute important habitat for lynx or prey species.

Birds

Numerous species of passerines and raptors can be found, but open pasturelands do not generally provide high-quality habitat for most species. The more complex sagebrush/grass-lands provide important habitat for several species of sparrows and cover for prey species.

The riverine corridor provides important habitat for neotropical migrants. The cottonwood forest environment, especially, provides important breeding habitat and habitat for migrating birds and facilitates greater diversity of avian fauna.

Bald Eagle — The riparian corridor provides important foraging and nesting habitat for the endangered bald eagle. There has been active nesting about a half mile west of West Gros Ventre Butte near the Snake River, west of the Mead/Hansen Ranches. Also, up to six alternate nests have been found in the Gros Ventre nest area, on the northeastern side of the confluence of the Snake and Gros Ventre. Only one nest was active in 2000. The original nest sighted in this area was on the south side of the Gros Ventre on the north-facing slope on the Mead/Hansen Ranches. It is possible that eagles would return to that nest.

Trumpeter Swan — As previously noted, due to a long-term decline in swan numbers, there was a recent petition to list this species as threatened or endangered (Biodiversity Legal Foundation and Fund for Animals 2000; USFWS 2000). The entire stretch of river as well as the spring creeks is critical swan wintering habitat. Concentrations have occurred between Moose and South Park. Swans have nested in the wetland area north of the Snake/Gros Ventre River confluence.

Amphibians

The boreal toad, Columbia spotted frog, boreal chorus frog, northern leopard frog, and tiger salamander could be expected in wetland habitat bordering study area properties. These areas have not been surveyed well, and little is known about amphibian densities. The Snake River and Gros Ventre corridors, and any areas that flood intermittently, such as quarries, would likely provide good habitat.

The Soil Conservation Service noted boreal toads in a quarry south of the town of Wilson on the Snake River (D. Patla, pers. com.). These toads have declined in abundance and distribu-tion in the Greater Yellowstone ecosystem (Koch and Peterson 1995) and the southern Rocky Mountain population is a candidate for federal listing as endangered in Colorado. The recent discovery of a chytrid fungus (*Batrachochytrium dendrobatidis)* on the nearby National Elk Refuge could have dire effects on all species of frogs, as well as the boreal toad which is known to be highly vulnerable (Patla 2000).

FISHERIES

The Snake River cutthroat trout is indigenous to Wyoming in the Snake River and its tributaries between Jackson Lake and Palisades Reservoir on the Wyoming-Idaho border. The Snake River

cutthroat is a subspecies of the Yellowstone cutthroat trout, distinguished by its fine spotting and its adaptation to streams and large river environments (Kiefling 1978). As such, it may be regarded as a key resource and value intrinsic to Grand Teton National Park's aquatic environment.

In 1964 the Wyoming Game and Fish Department initiated a long-term investigation of the Snake River cutthroat fishery. It was clear at that time, before much of the present-day development, that increased fishing pressure, irrigation demand, continued loss of habitat due to siltation of spawning sites, and the construction of flood control structures all constituted a threat to the species. Currently, a petition to list the Yellowstone cutthroat trout, including the Snake River subspecies, as a federally protected species is pending.

Wyoming has designated the Snake River as a class 1 river, signifying its national importance as a trout fishery and warranting the highest priority for protection. The Snake River and the Gros Ventre River flow through national park and private lands in the study area. Private lands are important in that they contribute spawning habitat for the entire fishery.

Important spawning habitat within the private study area lands is recognized in tributaries to the Gros Ventre River just above its confluence with the Snake River, and in tributaries to the Snake River proper, most notably the Bar BC Spring Creek and Spring Creek. Spring Gulch study area lands on the north are subtended by both the Gros Ventre and Snake Rivers. The western portion of the Jackson Hole Hereford Ranch is bordered by the Snake River along much of its length. Numerous management activities pursuant to the Snake River cutthroat fishery have been performed by the Wyoming Game and Fish Department in all these river and stream segments since 1956 (Kiefling et al. 1999). Flat Creek flows through the eastern portion of the Jackson Hole Hereford Ranch, but it is not identified in this area as an important spawning segment.

The current condition of spawning habitat in the areas of concern is considered stable. Access to either of the named tributaries is presently controlled by private ownership. The presence of cattle on these lands, in their current numbers and season of occupancy, does no appreciable harm to spawning gravels or redds.[2] During spawning seasons, both cattle and wildlife can damage redds as they cross streams in riffle segments. In general, flood control measures like levees have affected spawning habitat due to the loss of seasonal flushing mechanisms. Stability also means that waterborne silt and organic matter have settled into the streambed gravels, cemented them into a matrix, and reduced their efficacy as spawning habitat. Floods and higher spring flows disturb and turn the gravels, thereby flushing them of silt. Upstream control structures eliminate sources of fresh gravel for spawning habitat downstream, while upstream disturbances can still provide sources of sediment to fill the gravel interstices. In conclusion, existing spawning areas are functional and productive, but are also at risk from increases in siltation or further departures from natural hydrologic function.

CATTLE AND BRUCELLOSIS

Many changes have occurred in the park since 1950, when cattle grazing privileges were established in the enlarged Grand Teton National Park. These changes have affected the cattle grazing operations. For example, a free-ranging bison herd did not exist at that time, today it numbers about 600. Wolves were not present at all, and grizzly bears were uncommon in the park.

Given the controversy surrounding the management and killing of bison from the Yellowstone herd, any consideration about continuing cattle grazing in Grand Teton National Park must include an assessment of the potential risks. The risk of transmission of brucellosis from elk or bison to domestic livestock is extremely small, but it is a concern that must be addressed because of the potential economic impacts to the state of Wyoming.

Brucellosis is a disease caused by *Brucella abortus*, a bacterial organism transmitted

2. Redds are "nests" constructed by spawning females in streambed gravels. Loose gravels are prepared for egg deposition and subsequent fertilization by the male fish. Once the process is completed, the redd must remain unaffected by mechanical disturbance or siltation.

primarily by means of contact with birth or abortion products, and also milk. It was introduced to North America from European cattle, which subsequently infected both elk and bison in Grand Teton National Park. Brucellosis is of great concern to the cattle industry because it causes abortion and can result in large production losses. Bison in Jackson Hole have a 90% or greater seropositive test rate, and elk tested at the National Elk Refuge have a 30%–40% seropositive test rate. Live *B. abortus* may persist in the environment for several days under favorable conditions (Tom Roffe, pers. comm.).

Because of its potential economic impacts to the cattle ranching industry, brucellosis is one of the most regulated diseases of cattle in the United States. As part of a national effort to eradicate brucellosis the USDA Animal and Plant Health Inspection Service certifies states as brucellosis-free, class A, class B, or class C, depending on the rate of infection in all cattle herds in a state. A state's classification is important because if *B. abortus* is detected, numerous costs are incurred. Perhaps the most important costs are those associated with the refusal of other states to accept a state's cattle because of the perception that *B. abortus* might be present (National Academy of Sciences [NAS] 1998).

The Jackson bison herd is believed to have been infected with brucellosis since 1980 when the herd, numbering about 30 animals, began using supplemental feed at the National Elk Refuge. Today the herd numbers about 500 and is expected to grow by several hundred more before population control measures can be taken. Due to a lawsuit, control measures will not be undertaken until the completion of an environmental impact statement on elk and bison management.

Both horses and cattle can become infected with brucellosis. In 1935 horses were reported to be the source of a brucellosis infection in cattle (NAS 1998). In 1996 brucellosis was detected in a horse that had commingled with elk on the South Park elk feedground near Jackson (Greater Yellowstone Interagency Brucellosis Committee [GYIBC] 1997). Regulatory officials have concluded that wild elk or bison were the probable source of brucellosis infection in cattle in six instances in western Wyoming between about 1961 and 1989 (GYIBC 1997). Four of these infections appear to be closely related to elk wintering on state-owned feedgrounds. The remaining two cases are less clear, but might have been elk or bison (NAS 1998; GYIBC 1997). In all six cases it is possible that wildlife were not the source of infection, but other potential sources were not identified in the investigations. *B. abortus* can "hide" in an animal and not be detected for long periods of time (Tom Roffe, pers. comm.).

It is not possible to quantify the risk of brucellosis transmission from wildlife to livestock in Grand Teton National Park or elsewhere. However, the NAS study found that "the risk of bison or elk transmitting brucellosis to cattle is small, but it is not zero" (NAS 1998). Temporal and spatial separation of livestock has been identified as the best current means to reduce the risk of disease transmission.

Most abortions in wildlife have occurred prior to June 1 when cattle arrive in the park (Tom Roffe, pers. comm.). Elk calving is still occurring at that time, but cattle presence and elk calving grounds do not overlap during the birthing period. Also, elk tend to avoid cattle, and elk sanitize birthing sites by consuming placenta, vegetation with birthing materials, and even soil (NAS 1998). It is not known to what extent bison clean the birthing site, but they have been observed consuming the placenta. An aborted fetus from either species could contain sufficient *B. abortus* to infect cattle contacting the products of the abortion. Since cattle and brucellosis-infected elk have co-existed in Grand Teton National Park since before 1950 without transmission, there is some level of confidence that risk of infection from elk on summer range is insignificant.

There is overlap of use of bison habitat and cattle allotments between June 1 and July 1. By July 1, 95% of all bison births in Grand Teton will have occurred (Berger and Cain 1999). In addition, ongoing bison studies indicate that most bison calving occurs well away from cattle allotments. In late summer both cattle and bison are seeking green grass that has not cured. At that time of year uncured green grass is often more abundant on allotments where earlier grazing has delayed grass development.

While bison appear to avoid cattle and generally leave a pasture when cattle enter, commingling of the two species does occur, and bison use of a pasture prior to cattle entry is not uncommon. Short of containing livestock occasionally in bison-proof fencing, it is likely that the incidence

of commingling will increase as the bison herd increases.

One of the terms and conditions of all park grazing permits is that all cattle entering the park must be vaccinated against brucellosis if they are older than four months. Vaccination is 60%–70% effective (Tom Roffe, pers comm.). While there can be some degree of confidence that the probability of brucellosis transmission from elk to cattle in Grand Teton National Park is low, care will be taken not to assume this is true of a rapidly expanding bison population, and efforts to reduce commingling will continue.

AIR QUALITY

The federal Clean Air Act (42 USC 7401 et seq.) addresses two aspects of air quality — (1) air quality related values and the prevention of significant deterioration, and (2) air quality standards for public heath and welfare.

Grand Teton National Park is classified as a mandatory class I area under the Clean Air Act, as amended. This air quality classification is aimed at protecting parks and wilderness areas from air quality degradation. The act gives federal land managers the responsibility for protecting resources "that may be adversely affected by a change in air quality" (NPS, USFS, USFWS n.d.) Resources may include visibility or a specific scenic, cultural, physical, biological, ecological, or recreational resource identified by the federal land manager for a particular area. Federal land managers are charged with preventing significant deterioration of identified air quality related values in class I areas regardless of the pollution source.

The Clean Air Act, as amended, also requires the Environmental Protection Agency to establish national ambient air quality standards to protect public health and welfare. Standards are set for specific pollutants at levels that are hazardous for members of the human population who are at risk, that is, those with respiratory diseases, and those who are very young or very old. Wyoming, as a delegated authority for air quality, has the immediate regulatory responsibility for air quality in this sense.

No significant and persistent deterioration of air quality is reported in Grand Teton National Park. At some locations and times during the winter visibility is impaired and noxious fumes are evident from the recreational use of snowmobiles (NPS 2000c). Elevated levels of pollutants from snowmobiling may approach a regulatory standard occasionally at Flagg Ranch. All areas of the park are documented to be in compliance with federal and state air quality standards.

The primary air quality related value of concern in the context of this study is visibility, or "clean, clear air" from the standpoint of visitor experience and expectation. (Other identified air quality related values are ozone-sensitive plants and alpine lake aquatic systems with low acid neutralizing capacity; see NPS 1998). As noted, there are occasional impacts on visibility and odor during the winter from snowmobile traffic. During other times of the year, large volumes of automobile and bus traffic at entrance stations can have similar impacts. The major source of impact in the park is associated with wildfires, producing particulates and smoke that affect visibility for the duration of the fire.

Outside the park, air quality is regulated exclusively by the state. Sources of pollution at times include large volumes of idling and slow-moving automotive traffic through the town of Jackson. Other sources are traffic movement and wind across unpaved surfaces or unprotected bare soil areas that produce dust, and commercial cooking operations. During winter wood smoke generated primarily by residential heating lies over the town of Jackson and its environs. A haze is frequently visible over the southern end of Jackson Hole and is especially noticeable during temperature inversions common during the winter. Wildfires and prescribed fires on adjacent public lands, including the park, produce smoke that affect visibility and particulate levels in the air around Jackson and in Jackson Hole in general (Greater Yellowstone Area Clean Air Partnership 1999).

SCENIC VIEWS

Study Area Lands within the Park

Scenic views from the study area within park boundaries include unobstructed views from and to the Teton Range, with open range, cattle grazing, livestock fencing, and some riparian corridors in the foreground and midground. A

combination of viewshed maps, field checks, and photos were used to identify viewsheds from the park towards the study area properties outside of the park. (Views of study area lands within the park, specifically the northern and southern pastures, are not subject to actions possibly resulting in development and therefore have not been assessed in this section except for pastoral scenes.)

The planning team used Geographic Information System (GIS) viewshed maps, photos, and their own knowledge from field visits to determine views from each of the study area properties. The GIS viewshed maps were created from each viewpoint using a 2 meter viewpoint height projected over a sight radius across and beyond the study area. Views were projected using a digital elevation model (DEM) to determine obstructions to views based on topography. The planning team also used photos taken from each viewpoint to note non-topographic obstructions to views such as trees and buildings.

Grand Teton Summit

According to viewshed maps, views looking south toward the town of Jackson include un-obstructed views of the southern portions of the park, the study area, and the town of Jackson. Views of some portions of the study area in Spring Gulch are obstructed by topography and riparian vegetation along the Snake and Gros Ventre Rivers. Views of subdivision development and the airport are present in the foreground (see the Grand Teton Summit viewshed map).

South Grand Teton Entrance

Views are described looking to the north, the west, and the south. To the north, views of the Teton Range are prevalent. Views of subdivision and resort development in the foreground of the Teton Range is visible but partially hidden by downward sloping topography and riparian vegetation along the Gros Ventre River. Views to the west reveal portions of the Lazy Double A Ranch and the Mead/Hansen Ranches. The Box L Ranch and the southern portion of the Mead/Hansen Ranches are hidden from view by East Gros Ventre Butte. The town of Jackson is visible to the south. The Jackson Hole Hereford Ranch is not visible (see the South Grand Teton Entrance viewshed map).

Gros Ventre Junction

Views are described looking to the south, the west, and the north. To the south the town of Jackson and the Jackson Hole Hereford Ranch are not visible; a portion of Snow King Mountain immediately south of Jackson is visible. To the southwest, a majority of the study area lands in Spring Gulch are hidden by topography and riparian vegetation, although some portions of all of the ranches can be seen. To the west, some subdivision development is visible although it is partially hidden by downward sloping lands. Moving to the north, there is a full view of the Teton Range, with the airport and some development in the foreground (see the Gros Ventre Junction viewshed map).

Southeast Blacktail Butte

Views are described looking south to southwest from Blacktail Butte. Views of the town of Jackson are visible but partially interrupted by Millers Butte immediately northeast of town. The Jackson Hole Hereford Ranch is not visible because East Gros Ventre Butte is in the foreground. Views of the study area lands in the northern sections of Spring Gulch (the Mead Ranch and the Lazy Double A Ranch) are visible but somewhat obscured by riparian vegetation and along the Gros Ventre River (see the Southeast Blacktail Butte viewshed map).

Study Area Lands outside the Park

Scenic views from and across private lands within the study area contain views of the Teton Range, open pastures, and historic working ranches. Scenic views of the park from study area lands may include open vistas of sagebrush flats, willow-lined streams and other riparian areas associated with the Gros Ventre and Snake Rivers, and rolling foothills toward the dramatic rise of the Teton Range. Views from some study area lands or portions of study area lands are obstructed or interrupted by subdivision development or topography. Views on the northern properties are of pastoral scenes, open vistas, and the Teton Range. Farther south,

views toward the Teton Range become obstructed by West and East Gros Ventre Buttes.

A combination of viewshed maps, field checks, and photos were used to identify viewsheds from the study area properties toward the park. All views are described from the viewpoint looking west and progressing to the north.

Spring Gulch

North Spring Gulch — Foreground views consist of fence-lined pastures along Spring Gulch Road, and open, unobstructed views of the Teton Range. Any development to the north is obstructed by riparian vegetation along the Gros Ventre River and/or hidden by downward sloping topography. (See the North Spring Gulch viewshed map.)

Central-North Spring Gulch — Foreground views consist of fence-lined pastures along Spring Gulch Road, a barn, and other buildings associated with the Box L Ranch. As one turns to the north, cottonwood trees along the Gros Ventre River can be seen, with views of the Teton Range through the trees. (See the Central-North Spring Gulch viewshed map.)

South Spring Gulch — Fence-lined pastures are visible north and west of the intersection of Highway 22 and Spring Gulch Road. Open pastures dominate the foreground and are interrupted by West Gros Ventre Butte. Views progressing north are abruptly obscured by West Gros Ventre Butte and only the higher elevations of the Teton Range are visible. (See the South Spring Gulch viewshed map.)

Central-South Spring Gulch — Foreground views consist of fences along Spring Gulch Road. Sparse shrubs and the Spring Creek Equestrian Center are seen in the foreground. Both West and East Gros Ventre Buttes begin to obstruct views of open pastures. Development on West Gros Ventre Butte can be seen. Both buttes frame a view of the Teton Range to the north. (See the Central-South Spring Gulch viewshed map.)

South Park

Northeast Jackson Hole Hereford Ranch — Views across the property consist of open, fence-lined pastures with cottonwood trees clustered along irrigation ditches. Haystacks are present throughout the foreground and midground view. Farther west are views of Boyles Hill, with the Snake River Range in the background. Progressing north, there are foreground views of the high school and the surrounding subdivision. Background views consist of Snow King Mountain on the eastern side with East Gros Ventre Butte immediately north. From this viewpoint, views of the Teton Range within the park are obstructed by the aforementioned topography. (See the Northeast Jackson Hole Hereford Ranch viewshed map.)

Northwest Jackson Hole Hereford Ranch — Foreground views consist of open pastures. Boyles Hill can be seen beyond the pastures, and a full view of the Snake River Range is present from this point. Progressing north are views of pastures, haystacks, and cottonwood-lined roads in the foreground while houses in the adjacent subdivision are visible beyond the ranch. In the background views of the higher elevations of the Teton Range are visible. (See the Northwest Jackson Hole Hereford Ranch viewshed map.)

CURRENT LAND USES AND ZONING

Study Area Lands within the Park

Lands within the park are classified by the Grand Teton *Master Plan* as Natural Environment (class III) lands. This classification allows special uses, including grazing, stock driveways, and life estates. These lands serve primarily as a buffer or transition zone, with low-density use that has little impact on the ecological processes of the park. Study area lands within park boundaries are currently managed for grazing.

Study Area Lands outside the Park

Study area lands outside of the park are working ranches. Ranches within the Spring Gulch portion of the study area are within the rural zoning district. Approximately 40 acres of the Jackson Hole Hereford Ranch are within the suburban zoning district, and the remainder are

Table 2: Maximum Development Potential for Study Area Lands outside the Park

	Gross Site Area*	Maximum Number of Dwelling Units	Maximum Number of 35-Acre Sites
Spring Gulch			
• Mead/Hansen Ranches	3,067	573**	87.6
• Box L	760	155**	21.7
• Lazy Double A	871	174**	24.8
Subtotal	**4,698**	**902**	**134.1**
South Park			
• Jackson Hole Hereford Ranch	896	439***	25.6
Total	**5,594**	**1,341**	**159.7**

* Based on taxable property. These figures differ slightly from those calculated by digitizing areas in a GIS system.
** Planned residential development.
*** Combination of development density under planned residential development and planned unit development (see appendix D).

within the rural zoning district. Different land development scenarios under current zoning are presented in appendix D; maximum development under current zoning is shown in Table 2.

Table 2200 of the "Teton County Land Development Regulations" permits a variety of residential and nonresidential uses in both zoning districts. To subdivide the land for residential development, a development permit is required. Zoning in the Spring Gulch area would allow for a planned residential development (PRD). The South Park portion of the study area could also be developed as a PRD, and 40 acres would be available for development as a planned unit development (PUD).

Teton County Natural Resources Overlay Protection District

The Teton County natural resources overlay protection district is applied over current county land use zoning. This overlay provides added protection to those lands evaluated as critical wildlife habitat or important to wildlife migration. The purpose of the district is to protect and maintain (1) the migration routes and crucial winter ranges of elk, (2) the migration routes and crucial winter ranges of mule deer, (3) the crucial winter habitat of moose, (4) the nesting areas and winter habitat of trumpeter swans, (5) the spawning areas of cutthroat trout, (6) the nesting areas and crucial winter habitat of bald eagles, and (7) the natural resources and biodiversity that support the wildlife population. The district provides protection of these areas through development standards, mitigation, and habitat enhancement.

The natural resources protection district encompasses approximately ___acres of the Spring Gulch properties and approximately ___acres of the South Park properties. Any development proposal greater than 1 acre on lands subject to the overlay district would require an environmental analysis describing how the proposed development would be designed to preserve identified resources. Lands under a conservation easement may be exempt from the overlay district if the applicant demonstrates that the review satisfies the objectives of an environmental analysis pursuant to county regulations. In such instances, the study completed for the conservation easement may be substituted for the environmental analysis.

Teton County Scenic Resources Overlay Protection District

As with the natural resources overlay protection district, the scenic resources overlay district is applied over current land use zoning. The purpose of the district is to preserve and maintain the county's most frequently viewed scenic resources, which are important to both its character and economy. This is done through the establishment of several scenic areas within the scenic resources overlay district. The location, design, and landscaping of each development is regulated, so that the county's important scenic resources are preserved, maintained, or complemented. New development must be in the least obtrusive location on the property, the

exterior of the buildings must be painted in earth tones, and the roof must be covered with a nonreflective material. These regulations also specify that roads and driveways be located along the edges of pastures and meadows. Two scenic areas are associated with the study area: the Spring Gulch Road Scenic Area and the South Park Loop Scenic Area.

- *Spring Gulch Road Scenic Area* — The Spring Gulch Road Scenic Area extends along the eastern and western sides of Spring Gulch Road from Highway 22 to the Gros Ventre River and includes the East Gros Ventre Butte. It is an important county-wide scenic resource because it provides both scenic quality and traditional western character in a location near the town.

- *South Park Loop Scenic Area* — The South Park Loop Scenic Area extends along the eastern and western sides of the South Park Loop Road, from the north edge of the South Park ranches to High School Road and includes Hufsmith Hill. It is an important countywide scenic resource because the road corridor is lined by cottonwood trees planted along irrigation ditches. The scenic quality of this area depends on the preservation of the cottonwood corridor, which helps filter views of development in the adjoining hay meadows. These meadows provide foreground settings for views of Rendezvous Bowl and the Snake River Range.

ECONOMIC CONDITIONS

Teton County encompasses about 2.7 million acres. Of the total, 97% is public lands, most of which is managed by the federal government. Private lands total only about 76,000 acres and are concentrated in a 20-mile-long valley along the Snake River south of the park. Of the total private lands, about 13,600 acres are under conservation easements.

Ranching Operations

The ranches associated with this study account for about 7% of the total private lands and also most of the remaining larger unsubdivided agricultural properties in Teton County. A portion of the Lazy Double A ranch is currently covered by a conservation easement and negotiations for an additional easement are underway between the landowners and the Bureau of Land Management.

Historically, the vast majority of private land in Teton County has been in agriculture use. In 1987, farms and ranches encompassed a total of 72,197 acres of land. Of that total, only about 25,500 acres was irrigated and used for growing hay and other crops (U.S. Department of Agriculture).

With only limited private land available, livestock grazing on lands within Grand Teton National Park and Bridger-Teton National Forest has long been a critical element of the agricultural industry in Teton County. Most of the larger agricultural operations in Teton County are ranches running cow-calf operations, so that livestock is the primary product and livestock sales the major revenue source.

Grazing livestock on federal lands allows ranchers to maintain larger herds than if the industry depended entirely on private lands for both adequate summer pasture and hay fields to grow winter feed. This relationship between the ranching economy and public lands applies throughout the western states where grazing occurs on public lands managed by the Bureau of Land Management, the U.S. Forest Service, and the National Park Service. Larger herds yield higher gross revenue from livestock sales.

Despite the added revenue supported by grazing, ranching in Teton County is not highly profitable. Gross revenues typically are less than $9 million annually (U.S. Department of Agriculture). Production and operating expenses are so high that the local industry recorded positive net incomes in only six of the past nine years. (U.S. Bureau of Economic Analysis)

Special use permits issued by the National Park Service allow grazing on park lands, and permit holders pay special use fees for grazing privileges. Collections of such fees are placed directly in a fund for use in the park. In fiscal year 1999, the National Park Service collected about $8,700 in such fees. Approximately $7,400, or 85% of the total, was derived from permits associated with the Mead and Jackson Hole Hereford Ranches.

Grazing fees collected by the park do not cover the annual cost of the grazing program. In fiscal year 1999 the estimated cost of the grazing program was about $58,000. These costs include operation and maintenance of irrigation systems, maintenance of permanent fences and installation of temporary fences, range administration and resource protection measures, and program administration. Personnel costs, including seasonal employees, accounted for just over 75% of the annual cost.

Excluded from the above costs are the implicit capital investments necessary to extend grazing on a long-term basis while simultaneously promoting natural resource protection. Investments in permanent fencing and irrigation systems have been deferred for several years in anticipation of reduced livestock grazing levels, resulting in a backlog of $1,000,000 in needs to be addressed if livestock grazing were to continue on a long-term basis. Once completed, the funded improvements might slightly reduce annual operating costs for the grazing program.

Local Economic Conditions

The affected environment for local economic conditions focuses on Teton County, with some reference to the town of Jackson. Local economic conditions are the same for study area lands inside and outside the park. The economic conditions and influences affecting the ranching industry, tourism and other segments of the local economy, and the park are inextricably linked. Most economic and demographic data are collected and reported at a county level.

Grand Teton National Park attracted more than 2.68 million recreational visits in 1999, the 28th highest visitation in the national park system for the year, mostly between May and September. Attracted by the exceptional scenic, wildlife, and outdoor recreational opportunities throughout the region, high visitor volumes to the area have caused tourism, including seasonal and second home use, to become the dominant economic influence in Teton County's economy.

Historically, the local tourism industry catered to a relatively transient population. Most visitors would spend between a few hours and several days in the area before continuing their travels. This transient demand has given rise to an extensive base of overnight accommodations and eating and drinking establishments. There are now more than 4,800 rooms, cabins, and other short-term lodging accommodations in the valley (Jackson Hole Chamber of Commerce 2000).

More recently, the region's abundant outdoor amenities gained worldwide recognition and began attracting strong seasonal and second-home development. Over the past several years such development has been a driving force in the local economy, spawning a wide range of economic changes, including development pressure on ranch lands and rapidly rising real estate values for those lands. This section highlights some of the key economic characteristics and trends in Teton County.

Population

Recent population growth trends provide an initial insight into the dynamic economic forces at work in Teton County.

Teton County registered a population of 11,173 residents in 1990. About 46% of the total resided in the town of Jackson, the sole incorporated municipality in the county. The remaining residents lived in a number of unincorporated communities, large-tract rural subdivisions near Jackson, or outlying areas of the county. By 1999 Teton County's resident population had climbed to 14,532, a 30.1% increase over the 1990 census (see Table 3). Jackson's resident population expanded by 1,199 residents during the same period, a 23.4% increase.

Table 3. Teton County Population Growth, 1990–99

	Town of Jackson	Teton County
1990 (Census)	5,127	11,173
1999 (Est.)	6,326	14,532
Growth		
• 1990–99	1,199	3,359
• Percentage	23.4	30.1

Source: U.S. Census Bureau, Population Division, 2000.

Estimates of the Teton County's increase in resident population understate the full magnitude of local growth and development. In tourism communities, such as Jackson/Teton County, the effective population swells with an influx of seasonal residents, employees, and visitors. Locally the seasonal population has been climb-

ing as fast as, if not faster than, the resident population. Based on the inventory of short-term accommodations and the increasing number of seasonal residents, the summer population of Teton County is likely to be 2 to 2.5 times its resident population.

Employment, Labor Force, and Income

Teton County's labor market is also responding to the changing market forces. Between 1990 and 1998 the average annual full- and part-time employment in Teton County increased by more than 44%, topping 20,000 for the first time in 1998. Nearly 5,700 private, non-farm jobs were added (see Table 4).

Table 4: Changes in Teton County Employment, 1990–98

Year	Farm	Nonfarm Private	Government	Total
1990	167	12,611	1,344	14,122
1998	154	18,301	1,921	20,376
Change				
• 1990–98	-13	5,689	577	6,254
• Percentage	-7.8	45.1	42.9	44.3

Source: U.S. Bureau of Economic Analysis, 2000.

Farm employment in Teton County, including proprietors, declined from 167 to 154. The ranches associated with this study are family operated. In addition to family members working on the ranches, ranchhands are hired to help manage livestock, irrigate, cut and stack hay, and complete myriad jobs associated with ranch operations. Like other local employers, ranchers face increasing difficulty in hiring and retaining competent employees.

Within the private sector, employment is concentrated in industries sensitive to the pace of real estate development and the level of tourist activity, including seasonal and second home use. Thus, the number of jobs in the local economy in the construction, retail trade, services and finance, insurance and real estate industries exceeds statewide averages (see Table 5). In 1998 these sectors had combined employment of 16,567 jobs in Teton County, representing more than 81% of all employment in the county. By comparison, the statewide employment concentration in these industries was 57%.

Despite accounting for less than 3% of the state's population in 1998, nearly 6.5% of the statewide employment was in Teton County. More dramatically, construction jobs in the county accounted for nearly 12% of statewide construction employment, and local jobs accounted for nearly one of every 10 statewide jobs in finance, insurance, and real estate. Both of these sectors are particularly sensitive to the pace and level of new development.

The net expansion of Teton County employment between 1990 and 1998 outpaced the growth in population by nearly a two-to-one margin. Consequently, local unemployment is at historical lows. Unemployment in Teton County has been consistently below 3.0% since 1990 and averaged just 2.3% in 1999. During the summer unemployment rates commonly fall below 1.5%, even with a seasonal influx of workers. Equally striking is the fact that local employment outnumbered the resident population, 20,376 jobs compared to 14,193 residents.

Several factors contribute to this apparently anomalous situation. One is an extremely high labor-force participation rate. Teton County's resident labor force was estimated to be 11,030 in 1998 nearly 78% of the total population. In other words, virtually every adult of working age and many teenagers are in the active labor

Table 5: 1998 Employment by Major Industrial Sector, Teton County and Wyoming

Industry	Employment Teton County	Employment Wyoming	Percentage Distribution Teton County	Percentage Distribution Wyoming
Development and Tourism Related:				
• Construction	2,407	22,407	11.8%	7.1%
• Retail Trade	4,219	58,130	20.7%	18.4%
• Finance, insurance, real estate	1,982	21,185	9.7%	6.7%
• Services	7,959	78,838	39.1%	24.9%
Subtotal	**16,567**	**180,560**	**81.3%**	**57.0%**
Farm	154	12,398	0.8%	3.9%
Other private	1,734	61,994	8.5%	19.6%
Government	1,921	61,590	9.4%	19.5%
Total Employment	**20,376**	**316,542**	**100.0%**	**100.0%**

Source: U.S. Bureau of Economic Analysis, 2000.

Table 6: Comparative Population, Employment, and Labor Force Relationships, 1998

	1998 Population	1998 Employment	1998 Labor Force	Gross Labor Force Participation	1998 Ratio of Employees to Labor Force
Teton County	14,193	20,376	11,030	77.7%	1.85
Wyoming	480,045	316,542	257,266	53.6%	1.23
Idaho	1,230,923	737,116	653,738	53.1%	1.13
Montana	879,533	543,333	466,450	53.0%	1.17
Utah	2,100,562	1,313,022	1,061,300	50.5%	1.24

Sources: U.S. Census Bureau, U.S. Bureau of Economic Analysis, and the labor market information Websites of the respective states.

force. The local rate compares to statewide rates in the surrounding region of between 50.5% and 53.6% (see Table 6).

Despite the high labor-force participation, the ratio of employment to labor force in Teton County is 1.85 to 1. A ratio above 1.0 is not uncommon as many workers hold either several part-time jobs or a full-time and a part-time job. However, multiple-job holding cannot account for the extraordinary ratio of jobs to workers in Teton County. Rather, the difference is explained by a large number of workers commuting from nearby counties in Wyoming and Idaho.

Such commuting occurs primarily in response to the limited availability and high cost of housing in Teton County. Although it has long been a part of local economic reality, the level of commuting has increased significantly in recent years. In 1990 the net outflow of earnings (the amount earned by residents of other counties working in Teton County less the amount earned by residents of Teton County employed elsewhere) was $31.1 million. That total represented just over 11% of the total earnings paid by local private and public sector employers. By 1998 the net outflow had climbed to nearly $75 million or 14.6% of total local earnings (see Table 7). The net outflow of earnings recorded in Teton County in 1998 was the largest net residency adjustment of any Wyoming county.

Total annual earnings of employees and proprietors in Teton County have risen steadily with local economic growth. Total annual earnings climbed by more than $110 million in just five years, from $399.9 million in 1994 to $510.4 million in 1998 (see Table 8). At $194 million, the local services sector recorded the highest total earnings. Earnings in both the construction and retail trade sectors exceeded $70 million annually. Annual earnings by major industrial

Table 7: Teton County Net Resident versus Nonresident Earnings, 1990 and 1998

	1990 (millions)	1998 (millions)	Change
Teton County Resident Earnings	$ 242.5	$ 435.8	1,800%
Net Nonresident Earnings Outflow	$ 31.0	$ 74.6	240%
Total Earnings in Teton County	$ 273.5	$ 510.4	187%
Nonresident Share of Total	11.3%	14.6%	129%

Source: U.S. Bureau of Economic Analysis, 2000.

Table 8: 1998 Wage and Salary Earnings by Industry, Teton County and Wyoming

	1998 Earnings (millions)		Percentage Distribution	
Industry	Teton County	Wyoming	Teton County	Wyoming
Development and Tourism Related:				
• Construction	$ 77.3	$ 637.2	15.2	8.2
• Retail Trade	$ 74.7	$ 758.8	14.6	9.7
• Finance, insurance, real estate	$ 55.1	$ 380.6	10.8	4.9
• Services	$ 194.0	$ 1,450.6	38.0	18.6
Subtotal	**$ 401.1**	**$3,227.2**	**78.6**	**41.4**
Farm	($ 0.1)	$ 58.0	0.0	0.7
Other Private	$ 43.4	$ 2,621.6	8.5	33.6
Government	$ 66.0	$ 1,897.6	12.9	24.3
Total Earnings	**$ 510.4**	**$ 7,804.1**	**100.0**	**100.0**

Source: U.S. Bureau of Economic Analysis, 2000.

sector in Teton County mirror the patterns in employment, both with respect to the distribution within Teton County and relative to Wyoming.

The importance of the local development and tourism-related sectors is underscored by the fact that they account for nearly $8 of every $10 in local earnings. Furthermore, local earnings in the four development and tourism related sectors accounted for more than 10% of total statewide earnings in the respective sectors.

The increase in earnings, adjusted for inflation, shows net growth of $65.6 million, or 16.4%. Though strong, when combined with the 44% increase in employment, the increase in earnings suggests that average earnings have declined in real, inflation-adjusted terms. Moreover, considerable variance in earnings exists between the industrial sectors, contributing to significant income disparity among households.

Average weekly wages across all industries in Teton County rose from $452 in 1988 to $518 in 1999 (the state average was $476 in 1998 and $493 in 1999). For Teton County these weekly averages translate to annual totals of $23,504 and $26,936 respectively. As a result, Teton County's ranking in the state jumped from being tied for eighth in 1998 to third in 1999. More than half of the change resulted from payroll increases in the finance, insurance, and real estate industry, which reported an average weekly wage above $2,000 per employee. In other sectors average weekly wages ranged from $350 in retail trade to $1,003 in wholesale trade. The average weekly wage across all levels of government in 1999 was $572.

Personal income data for Teton County provides additional evidence of local economic disparities. High average wages in Teton County contribute to higher-than-average personal incomes for local residents. Per capita income in Teton County was $52,723 in 1998, more than 216% of the statewide average and nearly 95% higher than the national average of $27,203 (see Table 9). However, the sources of income in the local economy differ markedly from statewide and national averages, and suggest that many local households may not enjoy the high standard of living suggested by the high per capita income figures.

On the one hand, transfer payments, such as retirement benefits or social welfare assistance payments are lower in Teton County, on a per capita basis, than either the Wyoming or U.S. averages. On the other hand, per capita dividend, interest, and rental income is significantly higher in Teton County, exceeding the average income obtained from earnings at both the statewide and national levels. Because dividend, interest, and rental income tends to be concentrated in the upper income ranges, the total per capita income figure distorts the economic reality facing many households in Teton County. Evidence of this distortion is provided by the fact that the 1997 median household income Teton County was actually lower than the average per capita income (U.S. Census Bureau (d)). One implication of the income distortion is the local housing market, where housing availability and affordability for working households are major local concerns.

Residential Development and Its Implications for Ranching

In 1990 the total housing stock in Teton County numbered 7,060 dwelling units. The distribution of the housing stock reflected the population distribution patterns shown in Table 3. More than 20% of the total 1990 housing stock (some 1,457 dwelling units) was reported as being for seasonal use. Since that time, the number of dwelling units has risen sharply. From 1990 through October 2000 the county and town have issued building permits for more than 2,800 new homes, a 40% expansion (see Table 10).

The new residential construction was predominantly single-family residences, with permits

Table 9: 1998 Per Capita Personal Income Comparison

	Teton County	Wyoming	U.S.
1998 Per Capita Personal Income	$ 52,723	$ 24,312	$ 27,203
Per Capita Sources of Personal Income			
• Earnings	$ 28,283	$ 15,204	$ 18,448
• Transfer Payments	$ 2,187	$ 3,072	$ 3,639
• Dividends, Interest, and Rents	$ 22,253	$ 6,036	$ 5,115

Source: U.S. Bureau of Economic Analysis, 2000.

Table 10: Teton County Housing Stock, 1990–2000

	Town of Jackson	Unincorporated Teton County	Teton County Total
1990 (Census)	2,236	4,824	7,060
New Units Permitted, 1990–2000 (Oct.)	802	2,021	2,823
Approximate 2000 year-end housing stock	3,308	6,845	9,883
Percentage Increase	36%	42%	40.0%

Note: Assumes all permits resulted in a new home completion.
Source: U.S. Census Bureau (c)

issued for fewer than 400 multifamily units. More than 2,000 of the permitted units were to be located in unincorporated areas of Teton County, and a large segment of that construction was for the seasonal/second-home market, including an increasing number of large, showcase homes. More than 400 homes in Teton County have 6,000 square feet or more of living space (Teton County Planning Department).

The amount of new residential construction is particularly significant given limited private land ownership in Teton County. While a number of rural subdivisions with lot sizes of 1 to 5 acres have been approved over the years, a large proportion of the rural development has occurred on large-tract subdivisions with minimum lot sizes of 35 acres. Under Wyoming law, such development is exempt from most local zoning, review, and land use regulation.

In addition to allowing development to occur more rapidly than if local subdivision and zoning approvals were required, large-tract developments have market appeal to many segments of the seasonal/second-home market. By limiting development to one dwelling per tract, such development provides a form of open space, though not to the same extent provided by the previously undivided property. Large-tract developments also feature buffering from adjacent development, the ability to maintain unobstructed views and sufficient land to support one or more horses or cattle. Such benefits are now marketed actively by the local real estate community and have also helped establish a new market, the so-called “conservation buyer.”

“Conservation buyers” are conservation-oriented purchasers who are interested in properties having particularly scenic views, river frontages, critical wildlife habitat, or including wildlife migration routes. Such features may qualify the property for a conservation easement and the related tax benefits. By limiting future development, particularly where surrounding properties are also covered by conservation easements, buyers may view this as a means of protecting property values, as well as conserving open space.

While contributing to open space and habitat conservation in one sense, large-tract development is also seen as contributing to the rapid escalation in local real estate prices. Given the limited amount of private land, large-tract development effectively constrains the supply of developable land and housing. When combined with strong demand and some real estate speculation, a constrained supply results in rapid real estate price escalation.

One measure of the inflationary trends in real estate values indicates an increase in the mean value of local residential properties of more than 42% between 1996 and the beginning of 2000; from $323,500 to $460,000 (see Table 11).This trend is borne out by local data on real estate market activity. Sales prices for typical single-family residences ranged from $150,000 to $995,000 in 1999, with prices of luxury or trophy

Table 11: Residential Property Values in Teton County, 1996 to 2000

	Mean Value of Residential Property	Year-to-Year Percentage Change
1996	$ 323,500	NA
1997	$ 335,700	3.7%
1998	$ 364,200	8.5%
1999	$ 398,100	9.3%
2000	$ 460,000	15.5%
Total Change 1996–2000	**$ 136,500**	**42.2%**

Sources: Derived by Hammer, Siler, George Associates, using data from U.S. Census Bureau (b) and (c) and Wyoming Department of Revenue.

homes as high as $7.5 million. The median price for single-family home sales in 1999 was $390,000. Homesites sold from $80,000 to $700,000 for "typical" sites, with luxury sites selling for up to $5.6 million. In 1999, 27 homesites and 57 homes sold for $1.0 million or more (Benson and Benson 2000).

One preliminary estimate indicates that average sales prices climbed by 12% during 2000, with the values of some properties rising 20% to 25% per year over the preceding two years (Benson and Benson 2000). Another source reported several sales at over $12 million each in 2000. Even when those sales were eliminated, the average sales price of single family homes was nearly $897,000 and the median price was $565,000. The latter was an increase of 31% over 1999 (Hoffman and Associates 2001).

The rapid escalation in real estate prices has several implications for the area's economy. First, housing is not affordable for average wage earners. Given locally prevailing wages, most households that are not already property owners have little hope of purchasing a home in the area. Second, housing availability is tight. Many employees consequently commute daily from neighboring communities an hour or more away. Third, employers will face increasing difficulty in recruiting and retaining employees.

Strong residential development demand and interest in open space preservation are driving up the prices for agricultural lands. In 1991 a large ranch in the valley is reported to have sold for $5,000 per acre. In 1997 another large ranch sold at an average price of $40,000 per acre. Most recently, one property has reportedly attracted offers as high as $62,000 per acre, and a 700+ acre ranch property is reportedly under contract at an average price of nearly $100,000 per acre (Benson and Benson 2000). Though location and site-specific features such as scenic vistas or streams running through the property may explain some differences in prices, general development pressures and speculation are the major influence.

For agricultural landowners, high real estate land values not only force a reassessment of their decision to continue ranching, but also pose potential estate tax and liquidity problems. Given the marginal economic returns often generated by ranching, ranchers are confronted with the option, or pressure, to sell in order to realize the wealth tied up in their land. For ranchers affected by the current study, the prospect of future reductions in income and the loss of quality-of-life benefits resulting from the curtailment of grazing privileges adds to the inclination to sell.

To some degree, the impacts of rising land values on local ranching are already apparent. In the decade from 1987 to 1997 the number of farms and ranches in Teton County declined from 110 to 104 (see Table 12). More significantly, the number of such operations of 180 acres or more in size declined from 63 to 40. Although some of the affected lands remained in farming, as the number of farms of between 50 and 179 acres increased by 13, the net impact was a decrease in the amount of farmland from 72,197 to 52,370 acres. The decline of nearly 20,000 acres represents more than 25% of the entire privately owned land in Teton County. Contraction in the number of farming operations, coupled with weak commodity prices, have reduced the value of local production and the market value of land when assessed strictly on its agricultural productivity.

Ranching families who want to continue ranching and choose not to sell face difficulties trying to accomplish intergenerational transfers of the land. In the event of the death of a landowner,

Table 12: Selected Characteristics, Teton County Census of Agriculture, 1987–97

	1987	1992	1997	Changes 1987–97
Number of Farms (by size)				
• Less than 50 acres	25	27	29	4
• 50 to 179 acres	22	25	35	13
• 180 acres of more	63	50	40	(23)
Total	110	102	104	(6)
Land in farms (acres)	72,197	62,307	52,370	(19,827)
Market value of agricultural products sold	$ 8,010,000	$ 8,906,000	$ 4,654,000	($ 3,356,000)
Estimated agricultural market value of real estate (per acre)	$ 1,233	$ 1,684	$ 939	($ 294)

Source: U.S. Census of Agriculture

the estate is valued not on its agricultural use (about $1,000 per acre at present), but on its market value given its highest and best use. In this case, the highest and best use is generally 35-acre residential tracts. This situation often results in a significant estate tax liability, forcing a sale of property, regardless of whether that is the desire of the heir(s). In fact, several of the ranch properties involved in this study are already encumbered by estate tax liabilities due to the untimely death of the owner.

The inflationary trend in real estate prices and estate tax implications for ranching families influence open-space conservation efforts in Teton County. Though changes in national or global economic conditions may temper the rate of inflation in real estate, local values are unlikely to decline in the foreseeable future. Neither will the amount of privately owned land increase. Thus, options to address open-space conservation and ranching must be developed in the context of current market conditions and economic realities. Those realities include the legitimate economic interests of the ranch owners, the strains that high real estate values place on the ability of communities and open space conservation groups (such as the Jackson Hole Land Trust) to finance conservation easements, and the diminishing base of large, undivided ranches in Teton County.

VISITOR EXPERIENCE AND RECREATION

A multi-year visitor services project culminated in a 1996 report that defines visitation to Grand Teton National Park (Littlejohn). The report provides information about visitor demographics, activities, and factors of importance in their experience. The report concludes that the most common visitor activities are viewing scenery (84% of visitors), viewing wildlife (76%), and taking photographs (56%). Another survey conclusion is that visitors attach more importance to recreational opportunities in the park than to education al opportunities.

The public benefit of open space from the standpoint of park visitors is strongly related to visitor enjoyment and recreational opportunities. High public benefit in this context accrues to maintaining scenic values, including clean water and clear air, and opportunities for seeing wildlife. For park visitors who engage in more active recreational activities, the realization of these expectations adds another dimension to the recreational experience.

Local residents and people from outside the region visit Grand Teton National Park. Letters have been received from local residents who appreciate and enjoy the presence and rural feel of grazing in the park. Anecdotal evidence suggests that visitors to the Jackson area enjoy seeing cattle drives and pastoral scenes. On the one hand, it is not known whether such visitors equate these experiences with visiting Grand Teton National Park, or whether they even know they are in the park when they see grazing. On the other hand, some letters have been received from people who have encountered domestic livestock, or signs of livestock, on lands they know to be within the park. They express dismay at their presence and describe how their experience was severely diminished because of it.

Given the size and diversity of the visitor population, their opinions, values, and beliefs are likely to be varied. However, from the referenced survey, it might be assumed that those who visit and enjoy the park would not be in favor of changes in land use that would negatively affect opportunities for viewing wildlife or scenery within the park.

METHODS AND ASSUMPTIONS FOR THE ANALYSIS

This section contains the best available scientific information about critical impact topics and provides the analytical foundation for comparing the options. The terms "impact" and "effect" mean the same thing in this analysis. Predictions of short- and long-term effects as well as the intensity of effects are articulated in the analysis as follows:

Short term — The effect lasts five years or less.

Long term — The effect lasts more than five years.

Negligible — The effect is at lower levels of detection.

Minor — The effect is slight but detectable.

Moderate — The effect is readily apparent.

Major — The effect is severely adverse or exceptionally beneficial.

Following are the assumptions for each of the analysis topics.

Endangered or Threatened Species — Current literature on the species was obtained and reviewed. A local Wyoming Game and Fish representative was interviewed. Professional judgment was applied to the development and grazing scenarios under each option, given general knowledge of the types of impacts to be expected and how they could affect known habitat characteristics in the area. This is not a scientific analysis, rather it is a subjective treatment based on professional judgment.

Air Quality — Current literature on air quality was reviewed. Professional judgment was applied to the development and grazing scenarios under each option, given general knowledge of the types of impacts to be expected and how they could affect air quality and its related values in the area. This is not a scientific analysis, rather it is a subjective treatment based on professional judgment.

Local Economic Conditions — Impacts on local economic conditions of the identified range of options for protecting open space are described in terms of foreseeable effects on the local population, the economy, future residential development, and the ranching industry. Options that call for active efforts to effect open-space protection through the acquisition of conservation easements and/or changes in current tax laws have monetary costs associated with them. Estimates of such costs are presented here to respond to the direction in PL 105-81 to "estimate the costs of implementing any recommendations made for the preservation of the land" (sec. 2(b)(4)). Those estimates however, should be considered as order-of-magnitude cost estimates that are subject to critical caveats and limitations.

Visitor Experience and Recreation — For the analysis of effects on visitor experience and recreation, key considerations are how options might affect opportunities to view scenery and wildlife, and to enjoy clean air. This is a subjective analysis based on general recreation and visitor management principles. The analysis is not based on any specific survey.

It is assumed that the private study area lands will not be available to park visitors, so the option of acquiring these lands was dismissed from analysis.

OPTION 1: NO NEW PROTECTION OF STUDY AREA LANDS; CONTINUE PARK GRAZING PERMITS (NO ACTION)

Cultural Resources

Archeological Resources

Study Area Lands within the Park — Potential impacts to the cultural resources in the pasture-lands at Grand Teton National Park under any of the options could be major, both in the short and the long term. Survey and evaluation would need to be completed before definitive effects could be determined.

The potential direct effect to cultural resources from livestock grazing vary depending on the type of cultural resource involved and the intensity of grazing at those locations. Trampling causes impacts to archeological sites, which displaces and damages artifacts. Cattle congregate at springs, water developments, and along fence lines. High-use grazing areas with little or no vegetation cover could cause cultural material to shift out of context, cause stream-bank instability, and increase erosion and visibility of cultural material that could result in unauthorized collection or vandalism.

The park archeologist should develop a survey design, in consultation with the state historic preservation officer, to assess areas of high and low site probability that coincide with high potential for grazing damage. Along with survey plans, significant sites should be revisited to assess their condition and to monitor effects of livestock grazing.

Mitigation for any site determined significant, whether newly documented or reassessed, would require planning and consultation with the state historic preservation office and affiliated Native American tribal governments. Examples of mitigation are fencing, relocation of grazing activities, or data recovery.

The park is also required to consult with Native American governments to involve them in identifying and protecting traditional cultural properties located within the study area. These properties could include religious sites and ceremonial plant-gathering locations. Mitigation and/or monitoring could occur at traditional cultural sites where appropriate, and in a manner consistent with tribal concerns.

Study Area Lands outside the Park — Potential development on study area ranches in the Spring Gulch and South Park areas could significantly impact undocumented archeological resources. If unsurveyed sites were destroyed as a result of development, there would be no possibility of learning more about the prehistory of the area. The destruction of sites and the potential loss of knowledge would be major, long-term, negative impacts.

Cultural Landscapes and Historic Structures

This option would have no effect on historic resources and cultural landscapes in study area lands outside the park if grazing continued at its current level within the park, and the study area ranches outside the park continued their current cattle operations. However, if there was nothing to prevent the sale and development of the ranches, there would be no long-term protection for historic resources or cultural landscapes, and they could, at some future point, be adversely affected by changing land uses and/or new development.

There would be no effect on the historic resources and cultural landscapes within the northern and southern pastures of Grand Teton National Park, as there would be no change from existing conditions.

Watershed Conditions and Wetlands

Study Area Lands within the Park

Northern Pastures — Continuing grazing for an indefinite period would not facilitate a long-term solution to problems caused by the existing irrigation system. The current level of irrigation water diverted from Spread Creek would continue, as would the amount of return water flowing into the Snake River from the pastures. Spread Creek would continue to be dewatered below the diversion dam during low flows. Trampling damage by cattle would continue, as would ponding of excess water.

Southern Pastures — If grazing continued for any period, some infrastructure improvement would be required. This option would continue grazing for an indefinite period, so the repairs would probably be a series of annual fixes that would meet immediate needs, but not address the long-term need of improving cattle distribution. Trucking water might be the most economical short-term solution, and the large diversion of water in Kelly (an estimated 20–30 cfs) would no longer be required. If water was trucked, trampling damage of ditch banks by cattle and the resulting weed problems would be reduced.

Study Area Lands outside the Park

Watershed issues on private lands are limited and are the same as on most western ranches. The most significant impacts would be a result of diverting water from rivers and creeks for irrigation and the long-term impact of agricultural practices on riparian vegetation. Since soil tillage for hay production and pasture occurs only rarely, and since the private lands that might be tilled are flat and have little runoff, soil erosion problems are limited or nonexistent. Nonpoint source pollution from livestock may have an impact on water quality, but it seems unlikely that impacts from cattle would be as great as the total impact from humans were the areas subdivided and developed.

No short-term effects on watersheds are expected on private lands as a result of continuing existing conditions. In the long term there would be little impact on streamflow as the result of subdivision, assuming that irrigation continued. Peak demand for water could increase as a result of subdivision development, because multiple landowners would try to irrigate. However Wyoming water laws govern the total amount of water that can be diverted.

Vegetation Condition and Use

Study Area Lands within the Park

Under this option grazing would continue for an indefinite period of time. Because this period could be interpreted as short term, badly needed investments in fences, irrigation systems, and water distribution and delivery systems would be questionable. For example, the irrigation system in the irrigated pastures has deteriorated significantly over the past 50 years. Wooden headgates have rotted, and lateral ditches have been trampled when wet so they no longer contain water. An engineer did not design the original system, and many of the main ditches have too much fall, resulting in water velocities that further erode the ditches and make them deeper. Personnel from the Natural Resources and Conservation Service have estimated that the engineering and design cost for an irrigation system would be close to $100,000, and construction costs might well exceed $500,000.

In the past no major investments have been made to maintain or upgrade the park irrigation system. However, minor annual “fixes” are no longer sufficient to prevent major resource damage should grazing be continued in the park.

The following analysis assumes that option 1 would be short term, and that needed investments in infrastructure and cattle operations would not be made.

Northern Pastures — The northern pastures include both irrigated pastures and lands with native plant communities. In addition to cattle, this area is grazed by elk and bison. Recent management decisions on how and where to allow grazing in this area have often been driven by the potential for conflicts between cattle and wolves or grizzly bears. For example, in 1997 cattle were not allowed to graze Uhl Hill due to the presence of denning wolves.

It is necessary to irrigate while cattle are present on these pastures. This results in soil compaction and trampling of wet ditch banks, retarding vegetation growth and creating conditions more favorable to nonnative species. For example, Canada thistle, a noxious weed, does well in poorly aerated soils, which result from grazing on wet ground. This species is expected to increase in the short term.

Existing and continued deterioration of the irrigation system has resulted in water ponding in some areas and water not being delivered to other areas. These unirrigated islands have heavy musk thistle populations, a result of increased exposed soil. Areas where ponding occurs are subject to severe trampling damage.

Upland native plant communities that are not irrigated do not have stock water delivery systems that ensure good cattle distribution. As a result, bottomlands are largely Kentucky bluegrass. Away from water the native plant communities are in good ecological condition. It is unlikely that continued grazing by cattle would have measurable impacts on these sites in the short term.

In the long term it would be necessary to understand the use patterns of bison and elk in combination with cattle to determine the effects on vegetation.

Southern Pastures — Cattle distribution and forage use would continue to be uneven over these pastures. Over-utilization of forage near water and under-utilization of areas farther away would continue to influence the successional development of plant communities. While there is sufficient land to meet the current cattle forage needs in normal years, it is necessary to ensure even distribution of cattle grazing to prevent over-utilization and the resulting decline in vegetation condition.

As a general rule, cattle will not travel more than ½ mile from water to the area they choose to graze. Some studies indicate that the most even grazing patterns result when the travel distance is no more than a few hundred yards. Much of the land in the southern pastures is more than ½ mile from water, and most of the acreage is farther than a few hundred yards from water.

The conversion of native plant communities to plant species that tolerate over-grazing would continue under this option. Kentucky bluegrass, noxious weeds, sagebrush, dandelions, and other grazing-tolerant species would increase due to the lack of competition. Forbs and grasses that are not tolerant of grazing would decrease.

While the short-term effects of continued cattle grazing would normally be considered negligible, summer bison use in these same pastures has increased significantly during mid-summer in recent years. While bison move farther from water than cattle, they are looking for green grass, and the greenest grass in mid to late summer is regrowth found in those areas that were grazed earlier by cattle.

Grazing of the southern pastures by both cattle and bison has essentially resulted in grazing throughout the season, with very short rest periods. This combined use may well accelerate negative vegetational changes, especially increasing the abundance of noxious weeds in the short term.

Study Area Lands outside the Park

Changes in vegetation on private land under this option would all be long term and would occur only if and when the owner decided to subdivide or sell the lands for development. Many weed management experts have recognized that noxious weeds tend to increase when land is subdivided into smaller parcels and developed. As landscaping is installed, the structure and diversity of vegetation usually increases on those landscaped sites, but the care of pastures, hay-fields, and other non-landscaped sites usually declines, resulting in the increase of weedy species.

Wildlife Habitat

Study Area Lands within the Park

Northern Pastures — Continued grazing would reduce available forage for native ungulates.

There would be continuing potential for predator/cattle conflicts and mitigation. Preying on cattle by gray wolves (recently reclassified as "experimental, non-essential") or grizzly bears would result in long-term impacts if individual wolves or bears had to be removed.

Grazing would continue to be managed under current practices. Because grazing permits were expiring, irrigation maintenance was greatly reduced. Continued cattle grazing would require a new grazing management plan to minimize adverse effects on wildlife habitat.

Southern Pastures — There would be no change from the existing amount of cattle grazing. There would be continuing effects in terms of forage off-take and coincident reduction in available forage for native ungulates.

Study Area Lands outside the Park

Spring Gulch — With no changes from current policy, present ranching practices could remain, with ranch owners continuing to graze cattle in Grand Teton National Park pending action by Congress. This option would allow the study area properties to be retained as open space, at least for the short term. However, property owners would be free to discontinue ranching and to sell their properties, either to developers or to conservation buyers for conservation easements.

There is some habitat value associated with the ranchlands for elk and bison because these

animals have high levels of brucellosis infection and mingling with cattle is not acceptable. Elk sometimes depredate hay put out for cattle and have been moved or killed. Bison have rarely entered the study area, but Wyoming Game and Fish personnel would be required to remove them to prevent mingling or property damage if complaints were made.

Long-term continued grazing use of riparian areas could result in a loss of cottonwoods that would impact bald eagles nesting in these trees.

With regard to individual study area properties, overall rankings for quality of wildlife habitat placed the Mead Ranch highest, followed by the Hansen, the Lazy Double A, the Box L, and the Jackson Hole Hereford Ranches. When considering a possible buildout of 20%–35%, impacts to individual members of the various species could be potentially high or moderate, but to the wildlife population overall long-term effects were primarily considered low and rarely moderate. Even the densest scenario of development (902 units with 85% open space), which logically would cause a greater effect, would probably have low impacts on wildlife populations.

South Park — There would be no changes from current policy. The ranching practices of property owners would remain at status quo, and ranch owners could continue to graze cattle in Grand Teton National Park until Congress made a decision. This option would allow the study area properties to be retained as open space, at least for the short term. However, property owners would be free to discontinue ranching and to sell their properties, either to developers or to conservation buyers for conservation easements.

Although a section of South Park provides habitat for wintering elk and mule deer, it is primarily the area east of the highway and steep slope. It is likely that the portion of the property that would be developed would be the level, open area west of the highway; a maximum of 439 clustered dwelling units with 85% open space could be developed. Overall, South Park ranked low in terms of available wildlife habitat, and long-term impacts to both individual animals and wildlife populations would be negligible (except for impacts to individual mountain lions). There would be no major, long-term impacts to wildlife populations with development.

Fisheries

Maintaining private study area lands would have negligible effects on spawning habitat in the short term. In the longer term, as those lands were developed, effective habitat would be lost. Allowing grazing in the park for private ranching operations is important to fishery protection to the degree that it forestalls the loss of private lands in open space (at the level of their current status).

As ranching lands were developed over time, the character of the affected streams would be subjected to a number of impacts. Local and non-local residents would use the stream and its banks for recreation, thus affecting spawning gravels and providing new sources of sediment. Home construction and roads would compact large areas and change the runoff characteristics in the immediate drainage area, providing more sources of sediment and a faster routing of them into the stream proper. Channel control structures, bridges and culverts, and roads crossing the channel could affect the channel and streambed to a degree that spawning would no longer be possible (Kiefling, WGFD, pers. comm., Jan. 2001). Gravels would not be renewed, the substrate would be cemented, and there would be no opportunity for spawners to build effective redds or to keep them oxygenated.

The degradation or loss of effective spawning habitat in these important streams would affect the entire fishery. The fishery includes the Snake River in Grand Teton National Park. While there would be an impact on a blue ribbon, class 1 river, there would also be an impact on the intrinsic resources and values of the park. The potential for development could hasten the listing of the Snake River cutthroat trout, or once the species was listed, extraordinary means would likely be necessary to protect it.

Air Quality

Grazing within the study area, either inside or outside the park, does not directly affect air quality or air quality related values. Continued grazing could forestall the development of private lands in the study area, resulting in a moderate, beneficial effect. If private study lands were not protected, the development of new

residential areas, more roads, heavier traffic, and additional sources of wood smoke would add to the present high level of these same source types in the area. The overall cumulative effect would further impact views south from the park in terms of visibility, or clean and clear air (see also effects on visitor experience and recreation). With increased development immediately adjacent to the park, along with current sources affecting air quality, there would be a higher probability of producing a year-round regional haze effect in Jackson Hole and the park. In this event, it is conceivable that visibility and views within the park itself would deteriorate. This would demand some action on the part of the National Park Service, in cooperation with the state of Wyoming, to curb pollution sources in and around Jackson. There would be limited potential for violating national ambient air quality standards in the park, but this concern would remain for the town of Jackson.

Scenic Views

Study Area Lands within the Park

Northern and Southern Pastures — There would be no change to existing views of study area lands within park boundaries if ranching continued. If grazing was stopped, cattle would no longer be present on these pastures. Impacts could be considered beneficial or adverse, depending on individual preferences about cattle grazing as a scenic value in the park. Given the fact that grazing would continue in other areas of the park, the impact would be minor.

Study Area Lands outside the Park

Spring Gulch — There would be no change to existing views of and across the Spring Gulch properties if ranching continued. If ranches were developed under current zoning and land development standards, maximum densities could range from approximately 121 dwelling units on 35-acre lots to 902 clustered dwelling units, with 85% open space set aside (see appendix D). Regulations set forth for the scenic resource overlay district would require that new development be planned in the least obtrusive locations on the property and that nonobtrusive building colors and materials be used. In some cases, higher densities could allow for more open vistas than large lot subdivisions. However, large lot subdivisions could help retain some of the pastoral character that exists today. Nevertheless, the current pastoral character and lack of development on the Spring Gulch properties would be changed or lost. Impacts on views resulting from development in the southern portions of Spring Gulch would be less than impacts of development on the northern properties. This is attributed to the fact that open views to and from this area are somewhat limited by East and West Gros Ventre Buttes. The Teton Range would still be visible from Spring Gulch, however, views would be compromised by development in the foreground.

South Park — There would be no change to existing views of the South Park properties if ranching continued. If the South Park properties were developed under current zoning and land development standards, maximum densities could range from approximately 25 dwelling units on 35-acre lots to 439 clustered dwelling units, with 85% open space set aside (see appendix D). As with Spring Gulch, the scenic resource overlay district would require that new development be planned in the least obtrusive locations on the property and that nonobtrusive building colors and materials be used. Higher densities could allow for more open space and open vistas than large lot subdivisions. However, large lot subdivisions could help retain some of the pastoral character that exists today.

Effects on views would not be as great as effects on views from development on the Spring Gulch properties. This is attributed to the fact that open vistas have been somewhat compromised by many of the surrounding properties that have already been developed, and that views of the Teton Range within the park are not as visible from South Park. Regardless, the pastoral character and lack of development that currently exists would be changed or lost through development. The Jackson Hole Hereford Ranch is one of the few remaining large, contiguous properties that protects open space in the South Park area. On a cumulative basis, loss of this open space to development would add to a further loss of open space and open vistas in the area.

Current Land Uses

Study Area Lands within the Park

Northern and Southern Pastures — Grazing associated with permits extended through PL 108-51 could continue for an undetermined amount of time; therefore, pastures within the park would continue to be used for grazing. If permits were discontinued, grazing would decrease sharply in the park. Land use would change from grazed pastures to ungrazed pastures under current management practices (irrigated fields). Impacts would be major and long term and would be viewed as beneficial or adverse, depending on one's views regarding the best use of park lands.

Study Area Lands outside the Park

Spring Gulch — These properties would continue to be used for cattle operations unless such uses proved to be economically infeasible. If lands were sold and developed, densities ranging from approximately 134 dwelling units on 35-acre lots to up to 902 dwelling units in a planned residential development could be built on approximately 4,700 acres. To achieve any density, an environmental analysis would need to be completed for county review, and approximately 85% of these lands would need to be protected as open space. Impacts to land use resulting from development would be major and long-term.

South Park — As for the Spring Gulch area, the Jackson Hole Hereford Ranch would continue to be used for cattle operations unless such uses were economically infeasible. If South Park lands were developed, a variety of uses and densities could be achieved. Forty acres of the property is zoned suburban; densities could range from one 35-acre lot to 232 dwelling units through a PUD option with the affordable housing density bonus (see appendix D). The remainder of the property is zoned rural, and density scenarios could range from 25 dwelling units (on 35-acre lots) to approximately 207 dwelling units under a PRD if 85% of this area was set aside as open space. Collectively, a total of up to 439 dwelling units could be developed under current county land development regulations. Effects on land use resulting from development would be major and long term.

Economic Conditions

Under PL 105-81 grazing privileges on study area lands within the park are extended until Congress and the Secretary of the Interior implement recommendations regarding open space and grazing. Faced with continuing uncertainty regarding the future economic returns from ranching, the affected landowners would weigh options of how best to meet their objectives, including lifestyle and economic goals, within the context of the local real estate market.

Even with continued grazing, current and foreseeable tax liabilities would likely require some land sales. Depending on market conditions and individual landowner preferences, entire properties could be sold in a single transaction, or one or more tracts could be sold over an extended period of time. Such sales would not preclude the possibility of additional lands being protected by conservation easements, either through donation or bargain sale to local or state governments or a non-governmental organization, but such protection cannot be ensured.

Under current zoning the sale and subsequent development of one or more of the properties would accommodate additional residential development and population growth in Teton County. Foreseeable development scenarios range from about 160 dwelling units, assuming 35-acre tracts, to as many as 1,341 dwelling units (902 units on the Spring Gulch properties and 439 units on the South Park property). The upper end of the range is the equivalent of a 20% increase over the existing number of dwelling units in unincorporated Teton County. Such development is allowed by current zoning and is, therefore, consistent with the *Comprehensive Plan.*

Using the county's planning assumption of 2.1 persons per dwelling, such development would represent as many as 2,816 new residents. Much of the increase would be in the number of part-time residents because many of the units would likely be second or seasonal homes.

If the South Park property was annexed into the town of Jackson, the number of new dwelling units and the amount of population growth would be greater than the levels shown above**.**

Major short-term increases in ranch income would result from property sales, but long-term ranch income would decline as livestock production fell. Other sectors of the local economy would experience a minor to moderate stimulus due to construction activities and consumer demands associated with new development. Local employment and wage and salary earnings would increase, but the impacts would be minor relative to the overall Teton County economy.

Housing availability might be enhanced by future development of the affected private study area lands, but affordability would remain a concern. The cost of development, given the underlying real estate values and allowable densities, would keep overall housing costs high. County zoning does offer higher development density incentives to promote affordable housing development. These incentives, however, would come into play only if the properties were sold in larger tracts and developed under the PRD standards.

Based on current real estate values, the Open Space Work Group reported that ranch owners or their heirs face capital gains or inheritance tax liabilities in excess of $100 million. No direct federal funding to acquire conservation easements or changes in current tax laws to promote the same purposes are assumed under this option. Thus, there would be no impacts on the federal Treasury.

Although this option could result in an economic future different form current conditions, no significant cumulative economic impacts would be associated with this option. The primary decisions affecting economic conditions reside with individual landowners and the consequences of those decisions, e.g., potential sale and subdivision of lands are consistent with the county's *Comprehensive Plan.* Finally, the economic implications of future development represent only a minor to moderate change relative to the overall Teton County economy.

Visitor Experience and Recreation

As discussed in the "Existing Conditions" chapter, the most common visitor activities in Grand Teton National Park are viewing scenery, viewing wildlife, and taking photographs. To the extent that current visitors are satisfied with the experiences they have in the park, there is nothing in this option that would directly affect them in the short or long term. Recreational opportunities in the park would not be altered, nor would scenic qualities or opportunities to view wildlife. It is likely that most nonresident park visitors would be unaffected by the development of private lands within the study area since it would not affect what they perceive as the most important park values or resources.

Under this option an increase in residential development, unsurfaced roads, and traffic associated with study area lands outside the park could result in indirect effects on clean air and visibility as more dust and smoke drifted into the park. If this occurred, without any action by the county to enforce ordinances, a premier park quality that is highly valued by visitors would be adversely affected. Impacts could be considered long term and moderate to major.

OPTION 2: NO NEW PROTECTION OF STUDY AREA LANDS; DISCONTINUE PARK GRAZING PERMITS

Cultural Resources

Archeological Resources

Study Area Lands within the Park — Grazing permitted in accordance with PL 105-81 would cease inside the park. Therefore, there would be no new impact from cattle grazing on the cultural resources on these specific pasturelands. However, in order to fulfill its requirement under section 110 of the National Historic Preservation Act, Grand Teton National Park would still need to conduct survey and assessment as outlined under the impacts of option 1. The Park would still need to consult with the state historic preservation office in the evaluation of cultural resources as outlined by the National Historic Preservation Act.

Study Area Lands outside the Park — The Spring Gulch area has not been surveyed for archeological sites. Therefore, there are no data about prehistoric land use patterns for these specific study area lands. However, based on existing knowledge about prehistoric uses in the Jackson Hole area, it is likely that prehistoric sites may exist on these lands. Under option 2 the potential development of these lands could significantly affect undocumented cultural re-

sources. Once unsurveyed archeological sites were destroyed, there would be no possibility of learning more about the area's prehistory, a major, long-term, adverse effect.

The South Park properties have three known prehistoric sites. As described for the Spring Gulch ranches, there has been minimal archeological survey, but the likelihood of archeological sites is high here as well. Under option 2 the potential development of the South Park lands could significantly affect undocumented cultural resources, resulting in major, long-term, adverse impacts to prehistoric archeological sites. It is unknown what the impacts would be on a cumulative basis, since many areas have not been surveyed. The destruction of archeological sites would prevent the possibility of learning more about the prehistory of the area, a long-term, adverse effect.

Cultural Landscapes and Historic Structures

Study Area Lands within the Park — This option would have a minor adverse effect on the historic cultural landscape of the northern and southern pastures of Grand Teton National Park. If grazing was discontinued, some historic fencing and irrigation systems could be removed, which would affect the cultural landscape. Also, eliminating cattle in these areas would diminish the overall historic cultural landscape, as cattle grazing is a historic use in these areas. However, the end of grazing might also help preserve some of the historic structures, such as the barns along Mormon Row, which are occasionally damaged by cattle.

Study Area Lands outside the Park — Option 2 would have a major adverse effect on historic resources and cultural landscapes on study area ranches outside the park. Under this option it is assumed that study area lands outside the park would be sold and developed in accordance with current state and county zoning regulations, and that no new additional protection would be given to historic resources and landscapes. Ranch buildings and resources (such as residences, barns, fences, corrals, and hayfields) that were no longer needed for cattle operations would be removed. The demolition of historic resources, as well as new residential and/or commercial construction, would result in the irretrievable loss of the historic resources, cultural landscape, and the pastoral character of this area.

In terms of cumulative effects, this option would have a major adverse effect on the historic resources of Teton County and Jackson Hole, as it would result in a permanent loss of a significant portion of the area's ranching heritage. Also under this option the use of all cattle trails between Grand Teton National Park and adjacent ranches would be discontinued; many local citizens regard these trails as integral to the county's ranching heritage, an irretrievable loss.

Watershed Conditions and Wetlands

Study Area Lands within the Park

Northern Pastures — Discontinuing grazing and irrigation at the Elk Ranch would allow a minimum streamflow to be maintained in Spread Creek during low flow periods. It would still be necessary to maintain the diversion dam to maintain water levels at the Elk Ranch Reservoir for nesting trumpeter swans and other waterfowl, as well as to divert water for irrigation of the Moosehead Ranch and the Triangle X Ranch.

Without cattle and irrigation, irrigated water carrying fecal coliform from the pastures would not flow into the Snake River.

The effect of irrigation on wetlands in these pastures is not fully known, but it seems likely that there well could be a decrease in the size of wetlands.

Southern Pastures — Discontinuing grazing permits associated with PL 105-81 within the park would remove the need to divert water from Gros Ventre River for cattle. An additional 20–30 cfs left in the river during the spring would be insignificant with high water flows. As there is no minimum streamflow requirement, the additional water would likely be diverted in downstream ditches.

Study Area Lands outside the Park

Effects on local watersheds would be similar to those described for option 1, and there would be little impact on streamflow as a result of residential development.

Vegetation Condition and Use

Study Area Lands within the Park

Southern Pastures — In the short term stopping grazing privileges as extended by PL 105-81 would stabilize current conditions. A measurable improvement in plant communities is not likely to occur. Areas of disturbance, such as ditch and stream banks, would stabilize, and the lack of disturbance would decrease the susceptibility of these areas to invasion by noxious weeds.

In the long term native plant communities are not likely to become reestablished on pastures that were grazed or farmed and irrigated without active plant restoration due to the highly competitive nature of the introduced species. Without active intervention, these pastures would likely include exotic plants that can compete with the grasses.

Removing cattle would also remove the potential of using cattle as a vegetation management tool. Properly designed grazing systems can be used to influence vegetation composition and to address some specific wildlife habitat needs. For example, Oregon and other states have used early season grazing to increase elk use the following winter. Early grazing of grass delays phenological development, resulting in grass that is more palatable than ungrazed grass in late summer and fall. However, there has been little attempt made to date to use cattle in these ways in Grand Teton National Park. A successful grazing system that accomplishes these objectives would require higher inputs from both the ranchers and the agency as well as full public acceptance.

Northern Pastures — Stopping cattle grazing on the unirrigated uplands would not be likely to have any measurable effects as current use of these areas by cattle is limited. Areas near water and areas that are eroding due to cattle trailing would stabilize. Based on a noticeable change in willow communities (which were fenced to exclude cattle in 1999) root regeneration of willows would increase.

Irrigation would cease on pastures that are now irrigated. In the short term this would result in an initial decrease of plant production and an increase in noxious weeds. As wetland areas dry out, noxious weeds are likely to fill that niche.

Stopping grazing and irrigation would also remove the potential to provide elk and bison with high-quality green grass in the fall and early winter. There is some indication that high-quality feed at that time of year increases winter survival later.

As with the southern pastures, the restoration of native plant communities on irrigated pastures would need to be planned and conducted to ensure that these lands were set on the desired successional pathway.

Study Area Lands outside the Park

Changes in vegetation on private lands under this option would all be long term. Many weed management experts have recognized that noxious weeds tend to increase when land is subdivided and developed. As landscaping was installed, the structure and diversity of vegetation usually increases on these landscaped sites, but the care of pastures, hayfields, and other non-landscaped sites usually declines, resulting in an increase of weedy species.

Wildlife Habitat

Study Area Lands within the Park

Northern Pastures — Discontinuing cattle grazing would increase the amount of forage available for native ungulates. Carnivore/cattle conflicts would be eliminated, along with the enticement and management actions that endanger threatened carnivores. The dangers associated with commingling between cattle and brucellosis-infected wild ungulates would also be removed.

Diversion of water in the northern pastures would still be necessary but perhaps not to the present extent. Ranches such as Moosehead and Triangle X have water rights and Elk Ranch Reservoir needs to have water diverted to it so that nesting habitat for trumpeter swans can be maintained. Greater water availability in Spread Creek could have positive effects on some species.

Southern Pastures — Discontinuing cattle grazing would increase the amount of forage available for native ungulates. The dangers

associated with commingling between cattle and brucellosis-infected wild ungulates would also be removed.

Study Area Lands outside the Park

Spring Gulch — If ranches in Spring Gulch were developed, impacts to individual animals could be major or moderate, but to the wildlife population overall, long-term impacts would be negligible, or in a few cases moderate. Even the densest scenario of development (902 units with 85% open space) which logically would cause a greater impact would probably have negligible impacts to populations.

South Park — Although a section of South Park is winter habitat for elk and mule deer, it is primarily the area east of the highway and steep slope. It is likely that the portion of the property that would be developed would be the level, open area west of the highway. Overall, South Park ranked low in terms of available wildlife habitat, and if developed, long-term impacts to both local wildlife and populations would be negligible (with the exception of impacts to individual mountain lions). There would be no major, long-term impacts to wildlife populations.

Fisheries

It is likely that study area lands would be developed sooner than under option 1. Though the net long-term results of options 1 and 2 would likely be the same, discontinued grazing in the park could hasten the decline of spawning habitat on the private study area lands. In the event that cows could no longer go on public lands in the spring and early summer, they would continue to occupy the private land base through the spawning season, affecting spawning in a variety of ways. As those lands were developed over the long term, effective habitat would be lost.

As described for option 1, the development of private lands over time would affect the character of adjacent streams. Local and nonlocal residents could use the stream and its banks for recreation, thus affecting spawning gravels and providing new sources of sediment. Home construction and roads would compact significant acreages and change the runoff characteristics in the immediate drainage area, providing more sources of sediment and a faster routing of them into the stream proper. Channel control structures, bridges and culverts, and roads crossing the channel would affect the channel and streambed to a degree that spawning would no longer be possible. Gravels would not be renewed, the substrate would be cemented, and it would be more difficult for spawners to build effective redds or to keep them oxygenated.

The degradation or loss of effective spawning habitat in these important streams would affect the entire fishery, including the Snake River in Grand Teton National Park. While there would be an impact on a blue ribbon, class 1 river, there would also be an impact on the intrinsic resources and values of the park. The potential for development could hasten the listing of the Snake River cutthroat trout, or once the species was listed, extraordinary means would likely be necessary to protect it.

Air Quality

As described for option 1, the impacts of grazing (and discontinued grazing) within the study area, whether inside or outside the park, would not directly affect air quality or air quality related values. Discontinued grazing could indirectly affect the situation by hastening the pace of development on private study area lands. If these lands were not protected, the development of new residential areas, more roads, heavier traffic, and additional sources of wood smoke would add more air pollutants; the cumulative effect would be to further impact views south from Grand Teton National Park in terms of visibility, or clean and clear air (see also effects on visitor experience and recreation). With increased development immediately adjacent to the park, along with current sources of impact, the probability of producing a year-round regional haze effect in Jackson Hole and in the park would be increased. In this event, it is conceivable that visibility and views within the park itself would deteriorate. There would be limited potential for violating national ambient air quality standards in the park, but this concern would remain for the town of Jackson.

Scenic Views

Impacts to views inside and outside the park would be the same as those described for option 1. However, development could occur more quickly if properties were not protected as open space by some entity, hastening the impacts to views.

Land Uses

If study area lands outside the park are not protected by other agencies, then it is assumed the properties would be developed under current zoning in accordance with Teton County land development regulations.

Grazing associated with permits extended through PL 108-51 would expire and grazing would decrease sharply in the park. As described for option 1, effects would be major and long term and would be viewed as beneficial or adverse, depending on an individual's perception of the best use of park lands.

Economic Conditions

Terminating grazing privileges extended by PL 105-81 inside the park would adversely affect ranch income derived from livestock operations in the short term. Herd sizes would have to be reduced or other higher cost grazing and feeding options sought. Lowered incomes would undermine the economic viability of ranching and further reduce the quality-of-life benefits enjoyed by some ranchers. The net effect could well be an increased probability of sales or accelerated timing of at least some land sales, as compared to option 1. Such land sales would yield short-term increases in income for the affected landowners.

Over the long term the economic and development effects under this option would be comparable to those under option 1. Additional lands might be protected by conservation easements, either prior to or following the initial sale, but this could not be assured. County development regulations require set-asides of open space for development occurring under the PRD standards.

Although this option would result in an economic future different from current conditions, there would be no major cumulative economic impacts associated its implementation.

Visitor Experience and Recreation

As described for option 1, the most common visitor activities in Grand Teton National Park (viewing scenery, viewing wildlife, and taking photographs) would continue, and to the extent that current visitors are satisfied with the experiences they have in the park, this option would have no direct effect in the short or long term. To the extent that visitors would have more opportunities to view wildlife, this option would have greater beneficial impacts than option 1. However, the net result between the two over time might not be much different.

Recreational opportunities in the park would not be altered. Opportunities to view wildlife without cattle present could immediately affect visitor experiences one way or the other. For those visitors who enjoy a natural park landscape and resources that are unimpacted by grazing, this option would be a marginal improvement over option 1. For those who enjoy seeing cattle in a pastoral setting, this option would be less acceptable.

It is likely that most nonresident visitors to the park would be unaffected by the development of private lands and the loss of open space within the study area since it would not affect park values or resources.

Similar to option 1, the development of open space lands, and more unsurfaced roads, increased traffic and dust, and additional sources of wood smoke could affect scenic quality in the park, unless the local government took regulatory action to reduce pollution.

OPTION 3A: PROTECT OPEN SPACE WITH A COMBINATION OF METHODS

Cultural Resources

Archeological Resources

Study Area Lands within the Park — Grazing within Grand Teton National Park would continue

for at most 25 years (from ranches in Spring Gulch) or decrease (as grazing permits for ranches in South Park expire). If grazing privileges continued for the next 25 years, prehistoric properties could be degraded. In order to understand that degradation, archeological sites would have to be surveyed, assessed, and evaluated (as delineated in option 1). Once baseline information was available, monitoring could prevent deterioration from continued grazing. Survey, documentation, and evaluation would also fulfill Grand Teton National Park's section 110 requirements for inventory under the National Historic Preservation Act.

Study Area Lands outside the Park — To ensure the protection of cultural resources on lands under a conservation easement under this option, the easements would have to provide for an archeological survey and site assessment and evaluation. Once Spring Gulch was surveyed, and prehistoric resources were identified, documented, and evaluated, conditions could be attached to the conservation easement to ensure the protection of these resources. Sites would be evaluated according to the standards of the National Register of Historic Places. The parties involved in creating the terms of the conservation easements would develop mitigation plans for the possible damage or loss of significant cultural resources. Mitigation could include, among others, any of the treatments mentioned for option 1. If the easements included the above-recommended conditions, economic incentives and easements would preserve prehistoric cultural resources in Spring Gulch, resulting in long-term, beneficial impacts.

As in Spring Gulch, there has been minimal archeological survey in the South Park area. Under option 3a the presumed potential development in South Park could significantly impact undocumented cultural resources. The result would be major short-term and long-term negative impacts to potential prehistoric archeological sites. In the short term sites would be destroyed, making it impossible to learn more about the prehistory of the area, a long-term, negative effect.

Cultural Landscapes and Historic Structures

Study Area Lands within the Park — There would be no effect on the historic resources and cultural landscapes within the northern and southern pastures of Grand Teton National Park, as there would be little change from existing conditions. Although fewer cattle would graze in these pastures under option 3a, the historic irrigation and fencing systems needed to maintain grazing would continue to be maintained and preserved.

Study Area Lands outside the Park — Option 3a would have a major, long-term beneficial effect on the Spring Gulch properties, and a major long-term adverse effect on the South Park property.

As a result of continued cattle ranching, the historic resources and cultural landscapes associated with cattle operations in Spring Gulch would continue to be maintained and preserved. Also, conservation easements would provide for the long-term protection of historic resources, even if cattle operations ceased in the future. The level of protection would directly depend on the strength of the conservation easements.

However, under this option no action would be taken to protect open space ranch lands in South Park, which would probably eventually be sold and developed in accordance with current zoning regulations. This would likely result in high density residential and/or commercial development. Depending on residential density and associated open space, South Park ranch buildings and resources (such as residences, barns, fences, corrals, and hayfields) no longer needed for cattle operations could be preserved or removed. If South Park lands were developed at higher densities, the demolition of historic resources, as well as new construction, would result in the irretrievable loss of the historic resources, cultural landscape, and pastoral character associated with the Jackson Hole Hereford Ranch.

In terms of cumulative impact, option 3a would have a moderate adverse effect on the cultural resources of Teton County and Jackson Hole, as it would result in the permanent loss of historic resources on the South Park ranch. Also under this option, the Jackson Hole Hereford Ranch would no longer trail cattle to and from Grand Teton National Park, resulting in an impact on this traditional activity. However, ranchers in the Spring Gulch area would still be able to trail their

cattle to and from the park, so this traditional activity would not be altogether lost.

Watershed Conditions and Wetlands

Study Area Lands within the Park

Northern Pastures — A new irrigation system on the irrigated pastures (approximately 1,000 acres) would allow fences to be erected to keep cattle away from wetlands and willow stands, thus ensuring the protection of the most sensitive areas. A properly designed irrigation system and subpastures would remove the need to irrigate while cattle were present, thus reducing soil compaction, trampling damage, and the spread of Canada thistle.

A well-designed irrigation system would also reduce the total water required to irrigate. Runoff into the Snake River from return flows would cease. Ponding from excess water would cease, and trampling damage would be nearly eliminated.

Southern Pastures — The development of a stock water delivery system would reduce the demand for water from the Gros Ventre River to insignificant levels. Trampling damage to wet ditch banks would be eliminated with a buried pipeline system, and erosion due to trampling would be reduced.

Study Area Lands outside the Park

No watershed impacts in the Spring Gulch area would occur in the short or long term. There might be long-term impacts related to development in the South Park area as a result of subdivision development.

Vegetation Condition and Use

Study Area Lands within the Park

Extending grazing on park lands for 25 years, along with reducing total AUMs as a result of grazing privileges associated with the Jackson Hole Hereford Ranch ending, should be sufficient to justify the major infrastructure expenditures needed to develop a grazing management plan that would allow for the complete protection of the most sensitive areas. The combination would allow enough flexibility to address most conflicts with wolves and grizzly bears while implementing sound range and pasture management practices.

If cattle grazing continued in Grand Teton National Park, a grazing plan that addresses pasture and range management, would need to be developed.

Northern Pastures — Cattle grazing could be limited to the irrigated pastures at the Elk Ranch. The reduced number of AUMs would remove the need to graze cattle on Uhl Hill and Wolff Ridge to meet forage needs. Cattle trailing would still occur through areas west of the highway, but there would not be a need to extend the trailing time.

A new irrigation system on the irrigated pastures (approximately 1,000 acres) would enable the park to fence cattle away from wetlands and willow stands, thus protecting the most sensitive areas. A properly designed irrigation system and subpastures would remove the need to irrigate while cattle were present, thus reducing soil compaction, trampling damage, and the spread of Canada thistle.

A large amount of high-quality forage could be left for elk and bison to use in late fall and early winter. The remaining forage would likely exceed the total pounds that would be left if cattle were removed and irrigation ceased. The quality could be much higher than forage that had been ungrazed and dried out early.

Southern Pastures — Developing a stock water distribution system, dividing the pastures into subpastures using fencing, and reducing AUMs would allow the development of a rotational grazing system that could improve plant species composition.

By using cattle to duplicate grazing patterns of native ungulates, it might be possible to help restore native plant communities. This would require increased rancher involvement, as cattle would have to be moved more often, perhaps every three days, and a lot of portable electric fencing would need to be installed and removed. It is also possible that the artificially high populations of winter-subsidized bison and elk

would negate any positive benefits by creating more desirable feeding areas for them.

Study Area Lands outside the Park

Vegetation in the Spring Gulch area would not change significantly. Eventually, as the South Park area was developed, changes in vegetation would be the same as those described for option 1.

Wildlife Habitat

Study Area Lands within the Park

If cattle grazing continued in Grand Teton National Park, a grazing plan should address the commingling of bison, wolves, grizzly bears, and cattle.

Northern Pastures — With the continuance of grazing, there would be continuing impacts of cattle grazing in terms of forage off-take and coincident reduction in available forage for native ungulates.

There would be continuing potential for predator/cattle conflicts and mitigation. Gray wolves and/or grizzly bears would be removed if they preyed on cattle, a long-term, adverse effect on individual animals. With fewer cattle, there could be a decrease in predation possibilities, which would constitute a long-term beneficial impact for carnivores.

If a new grazing management plan was implemented, there would be better forage for wildlife on Uhl Hill as a result of improved management practices. Greater water availability in Spread Creek could have effects on some species, but these are unknown at this time.

Southern Pastures — There would be decreased cattle grazing with the expiration of the South Park privileges. Although effects would be reduced, continuing grazing would negatively affect forage off-take and coincident reduction in available forage for native ungulates.

Study Area Lands outside the Park

Spring Gulch — There is some habitat value associated with the ranch lands for elk and bison because these animals have high levels of brucellosis infection and mingling with cattle is not acceptable. Elk sometimes depredate hay put out for cattle and have been moved or killed. Bison have rarely entered the study area; but if they did, Wyoming Game and Fish Department personnel would be required to remove them to prevent mingling or property damage if complaints were made.

Long-term continued grazing use of riparian areas could result in the loss of cottonwoods that could result in negative impacts to bald eagles that nest in those trees.

South Park — As described for options 1 and 2, the portion of South Park lands that would likely be developed would be the level, open area west of the highway. Overall, South Park ranked low in terms of available wildlife habitat and, with the exception of impacts to individual carnivores (mountain lions), long-term impacts to both local wildlife and populations were categorized as low. There would be no major long-term impacts to wildlife populations.

Fisheries

Of greatest importance would be the protection of lands in Spring Gulch and Spring Creek spawning streams. This option would avoid the impacts discussed in the previous two options associated with excessive numbers of cattle on private lands during the spawning season, and the irretrievable impacts of the development on spawning habitat. It would further avoid the more far-reaching degradation of the entire fishery, which includes the Snake River in Grand Teton National Park. The Snake River cutthroat trout as an important resource and value of the park would be maintained. Discontinued grazing in the Gros Ventre, East Elk Ranch, and Uhl Hill areas in the long term could marginally improve watershed conditions with respect to soil compaction and grassland sediment sources.

Air Quality

The impacts of grazing within the study area would not directly affect air quality or air quality related values. To the extent that continued grazing could forestall the development of private lands in the study area, there would be a positive indirect effect favoring the maintenance of the present level of air quality. If private study lands were protected, the potential impacts of development of new residential areas, more roads, heavier traffic, and additional sources of wood smoke would be prevented, compared to options 1 and 2. Therefore, the potential for a regional haze to develop that would impact air quality related values and visitor experience in the park would not be increased.

Scenic Views

Study Area Lands within the Park — Fewer cattle would graze on study area lands within the park because grazing permits on the Gros Ventre, Elk Ranch, and Uhl Hill pastures would be discontinued in the long term. Impacts could be considered beneficial or adverse, depending an on individual's preferences about cattle grazing as a scenic value in the park. Modified grazing practices as approved through a new grazing management plan could improve the pastoral qualities of these lands, resulting in beneficial impacts to scenic views.

Study Area Lands outside the Park — Views of study area lands in Spring Gulch could remain in their current condition if land protection methods protected all study area lands in this area from development while protecting historic structures and archeological resources. Conservation easements covering portions of the study area lands in Spring Gulch, depending on the location, could protect views of the Teton Range and help retain some of the openness and pastoral character of the properties. However, some development could occur without total protection of study area properties, compromising the scenic values of study area lands in Spring Gulch. Effects on views could be moderate to major depending on the amount and location of study area land open to development.

If study area lands in South Park were developed, impacts to scenic views would be the same as those described for option 1.

Land Uses

Study Area Lands outside the Park — Land uses in the Spring Gulch area would remain the same. Grazing associated with the Mead grazing permit would continue, and the Lazy Double A and Box L Ranches would be protected with conservation easements. No additional development would occur. Impacts could be adverse or beneficial and would be long-term.

Impacts to land uses in South Park would be the same as under option 1.

Economic Conditions

Option 3 calls for active federal participation to protect open space. For purposes of this study, that participation might involve funding the acquisition of conservation easements, changing tax laws, extending grazing privileges for up to 25 years, or a combination these methods. The value of these methods is estimated in monetary terms. However, this estimate is predicated on numerous assumptions and is subject to limitations, including the following:

- All transactions must occur within a framework of a willing seller and a willing buyer. In other words, transactions would only occur if mutually acceptable economic and non-economic conditions were identified and accepted.

- Landowners would have to be willing to consider options involving conservation easements. No discussions between the National Park Service and affected landowners have taken place to assess acceptable terms or the economic values associated with such easements. Consequently, there are no assurances that agreements to establish conservation easements would be achieved.

- A reasonable objective for landowners would be an agreement providing net monetary returns comparable to what they would realize by selling their property at fair market value. In other words, landowners would seek a return approximating fair market value less expected capital gains or inheritance taxes.

- Individual landowners could accept less than full expected monetary value. For example, a landowner's interest in preserving wildlife habitat, open space, the local ranching heritage, or in retaining ownership and continuing to ranch, might result in a willingness to accept a lesser offer or to donate a conservation easement over part of the property. However, for the purposes of estimating the costs associated with this option, costs are based on the fundamental premise of full equivalent value described above.

- No appraisals of either the land or conservation easement values of the affected private study area lands were prepared in conjunction with this study. Furthermore, most information regarding the monetary value of real estate transactions, including the values of conservation easements, are not public under Wyoming law. Consequently, the estimated costs are based on limited data.

- The Open Space Work Group reports that land values range "from $40,000 to $100,000" per acre. Given available data, that range reasonably characterizes real estate land values in Teton County. But land values may vary considerably among and even within the individual ranches. Furthermore, although the local real estate market is extremely active and has seen a pattern of escalating sales prices eclipsing previous records, there have been few sales of comparable properties.

- Conservation easements would be tailored to meet the specific requirements and conditions of each situation. The market values of conservation easements are functions of many factors, including the degree of development control included in the easement. In other words, what rights does the landowner give up or retain? The more restrictive the easement and the greater the development opportunities foregone, the higher the value associated with the easement.

- Information provided by Teton County indicates complex ownership structures for several of the properties. Such complex ownership increases the challenge for defining agreeable terms and conditions for real estate transactions. For simplicity, the current study assumes that each ranch is a single property or entity with a single ownership representative.

Given the factors outlined above, this analysis assumes that the average cost of acquiring conservation easements would range between $35,000 and $50,000 per acre. This range would allow for a wide range of fair market values and a high degree of development control within the conservation easements. These values establish an order-of-magnitude cost.

The value of livestock-related revenues and lifestyle maintenance associated with the continuation of grazing would reduce the direct funding required.

The estimated costs are predicated on action being taken specifically to achieve the long-term protection of open space. Broad-scale tax reform affecting agricultural properties or inheritance taxes might reduce pressures on affected landowners to sell, or enhance their willingness to donate or create conservation easements at bargain sales, but such actions would not necessarily ensure the objective of open space protection.

The objective under option 3a is to protect the study area properties in the Spring Gulch area by means of conservation easements. Grazing privileges would be extended up to 25 years for Spring Gulch ranches. No action would be taken to protect the South Park properties.

The combination of extended grazing privileges and the establishment of conservation easements would promote continued ranching in Spring Gulch over the long term. Land use and the amount of development in Spring Gulch would remain largely unchanged due to likely development restrictions associated with conservation easements. The potential development of up to 902 dwelling units allowed under current zoning would not occur. Population growth and the employment and income impacts associated with such development would not occur in that area.

Terminating grazing privileges for the South Park properties would adversely impact ranch income from livestock operations, negatively affecting the economic viability of ranching and reducing

the quality-of-life benefits enjoyed by the affected ranching families. The income loss would greatly increase the likelihood that ranchers would sell or develop some or all these lands within a short time. Some lands might be protected through conservation easements, either prior to or following the initial sale, but this could not be ensured.

Current zoning would allow for the development of up to 439 dwelling units on the Jackson Hole Hereford Ranch. The area is being considered for annexation by the town of Jackson. If this occurred, development at even greater density is probable.

Major short-term increases in ranch income would result from conservation easement sales in Spring Gulch and the sale of some or all the South Park lands, but long-term ranch income would decline as livestock production fell. The long-term changes in ranch income would be minor in relationship to the overall Teton County economy.

The estimated outlay to acquire conservation easements under this option range from $137 million to $195 million. Such an outlay would represent a major federal expenditure. Under current tax law, a sizable share of the outlay would return to the Treasury as tax revenue. The costs associated with maintaining the grazing management program would also be borne by the National Park Service, but these costs are minor compared to the cost of conservation easements. Changes in tax law could affect the direct costs, as could changes in local market conditions and landowner response to the extension of grazing privileges.

As with the preceding options, no major cumulative economic impacts are associated with this option, even though it would result in a different economic future compared to current conditions.

Visitor Experience and Recreation

The most common visitor activities (viewing scenery, viewing wildlife, and taking photographs) and recreational opportunities in the park would not be affected, nor would scenic qualities or opportunities to view wildlife. These activities would extend beyond park boundaries and could have beneficial impacts to the visitor experience. It is likely that impacts would be negligible since important park values and resources would not be affected.

Compared to options 1 and 2, the long-term protection of Spring Gulch lands in open space would prevent potential impacts from development, such as increased roads and traffic, and increased pollutant emissions, resulting in moderate beneficial effects on the visitor experience. However, the probable development of lands in the South Park area would result in these impacts (see option 1).

OPTION 3B: PROTECT OPEN SPACE BY REALLOCATING EXISTING GRAZING PERMITS AND OTHER METHODS

Cultural Resources

Archeological Resources

Study Area Lands within the Park — Under option 3b grazing within Grand Teton National Park would continue at current levels for at most 25 years. Reallocating grazing permits from South Park to Spring Gulch ranches would not lead to a net change in grazing in the park. If grazing permits continued for the next 25 years, possible degradation to prehistoric properties could continue. This would result in irretrievable negative impacts unless an archeological survey, assessment, and evaluation of sites (as delineated in option 1) was completed.

Study Area Lands outside the Park — Conditions of the conservation easements for the Spring Gulch properties to survey, assess, and evaluate prehistoric sites (as delineated in option 3a) would also apply. If the easements included the recommended survey and evaluation, easements and economic incentives would serve to preserve prehistoric cultural resources in Spring Gulch, resulting in a major, long-term beneficial impact to archeological resources.

As described for option 3a, there has been minimal archeological survey in the South Park area, and the likelihood of archeological sites is high. Potential development on South Park lands under option 3b could significantly impact undocumented cultural resources, resulting in major long-term, negative effects on prehistoric archeological sites. Even in the short term sites would

be destroyed, making it impossible to learn more about the prehistory of the area, a long-term negative effect.

Cultural Landscapes and Historic Structures

Study Area Lands within the Park — Option 3b would have a minor adverse effect on the cultural landscape of the northern and southern pastures of the park. With the stopping of grazing over 25 years, some historic fencing and irrigation systems could be removed, affecting the cultural landscape. Also, eliminating cattle in these areas would diminish the overall cultural landscape, as cattle grazing is a historical use in these areas. However, the end of grazing might also help preserve some of the historic structures, such as the barns along Mormon Row, which are occasionally damaged by cattle.

Study Area Lands outside the Park — Option 3b would have a minor adverse effect on the Spring Gulch properties, and a major adverse effect on the South Park properties.

Grazing rights would continue to ranches in the Spring Gulch area, resulting in the protection of historic resources through conservation easements. The level of protection would directly depend on the strength of the conservation easements. Nevertheless, the cultural landscape of Spring Gulch would change over the long term as a result of the probably end of cattle ranching operations. Although historic buildings, structures, and landscapes would be afforded some level of protection through easements, it is likely that hayfields, irrigation systems, and other landscape features associated with an active cattle ranch operation would be removed. It is also likely under this option that at least limited new construction would occur within Spring Gulch, affecting the overall pastoral character and cultural landscape of the area.

Since grazing rights within Grand Teton National Park would be discontinued under this option for the Jackson Hole Hereford Ranch, cattle ranching would also be likely to be discontinued on this property. It is assumed the ranch would be sold and developed in accordance with current state and county zoning regulations, likely resulting in high-density residential and/or commercial development. South Park ranch buildings and resources (such as residences, barns, fences, corrals, and hayfields) no longer needed for cattle operations could be removed, resulting in the irretrievable loss of the historic resources, the cultural landscape, and the pastoral character of the South Park lands.

In terms of cumulative impact, option 3b would have a moderate adverse effect on cultural resources in Teton County and Jackson Hole, as it would result in the permanent loss of historic resources and cultural landscapes in South Park, and the likely long-term loss of cultural landscape features in Spring Gulch. Also under this option, all cattle trails to and from Grand Teton National Park, which many local citizens see as integral to Teton County's ranching heritage, would eventually come to an end.

Watershed Conditions and Wetlands

Study Area Lands within the Park

Watershed effects on the southern and northern pastures would be the same as those described for option 3a.

Study Area Lands outside the Park

Watershed effects in the Spring Gulch and South Park areas would be the same as those described for option 3a.

Vegetation Condition and Use

Study Area Lands within the Park

Under option 3b it is assumed that the total number of AUMs would be the same as now since grazing privileges for the Jackson Hole Hereford Ranch would be reassigned to ranches in the Spring Gulch area.

Northern Pastures — In the short term removing cattle from Uhl Hill, Wolff Ridge, and other sensitive sites would be delayed until a new irrigation system was constructed and fully operational. It might be necessary to increase cattle use on these areas during construction and pending grass establishment on disturbed areas. Most of the other benefits described for option 3a could be achieved, but there would be a reduced

potential for the amount of fall and winter forage that could be left for bison and elk.

Southern Pastures — With the development of a water distribution system for grazing cattle and dividing this area into six subpastures, a rest/rotation or deferred grazing system could be developed, similar to that described for option 3a. While many of the goals described for option 3a could be met, the additional AUMs would require increasing the grazing period in each subpasture by some number of days, potentially delaying the benefit of using cattle as a means to restore vegetation communities.

Study Area Lands outside the Park

Vegetation in the Spring Gulch area would not change significantly from existing conditions. With the likely development of lands in the South Park area, the same type of changes as described for option 1 would occur.

Wildlife Habitat

Study Area Lands within the Park

Northern Pastures — Impacts would be similar to those described for option 3a. Although South Park AUMs would be distributed to other properties, levels of cattle grazing would remain the same.

There would be no change from the existing amount of cattle grazing. With the continuance of grazing, there would be continuing impacts in terms of forage off-take and coincident reduction in available forage for native ungulates. Modified grazing practices could improve the condition of pastures.

Southern Pastures — Although South Park AUMs would be distributed to other properties, levels of cattle grazing would remain the same. With continued cattle grazing, impacts in terms of forage off-take and coincident reduction in available forage for native ungulates would remain.

Study Area Lands outside the Park

Spring Gulch — Impacts associated with this option would be the same as option 3a. Permits from South Park would be distributed between the Lazy Double A and Box L Ranches, and there could be more cattle on these ranches in winter months. Conservation easements would protect study area lands from development if easements covered acreages not currently in easement. These easements would protect wildlife habitat if specified in the terms and conditions of the easement.

South Park — Impacts would be the same as option 3a. This study area property would be developed. Habitat value was ranked low, and there would be no major long-term impacts to wildlife populations.

Fisheries

Of greatest importance would be the protection of lands in Spring Gulch and the Spring Creek spawning streams. This would avoid the impacts discussed in options 1 and 2 that would be associated with excessive numbers of cattle on private lands during the spawning season, and the irretrievable impacts on spawning habitat of eventual development. It would further avoid the more far-reaching degradation of the entire fishery, which includes the Snake River in Grand Teton National Park. The value of the Snake River cutthroat trout as an important resource and value of the park would be maintained. Inasmuch as the park is also occupied by ungulate species, the general impacts of forage utilization would continue.

Air Quality

As described for the other alternatives, the impacts of grazing within the study area would not directly affect air quality or air quality related values. To the extent that continued grazing forestalled the development of private lands in the study area, there would be a positive indirect effect favoring the maintenance of present air quality levels as a result of less development (fewer residential areas and roads, less traffic, and no additional wood smoke sources), compared to options 1 and 2. There would be less likelihood of regional haze developing and

affecting air quality related values and visitor experiences in the park.

Scenic Views

Study Area Lands within the Park — The amount of grazing that currently occurs would continue for at least 25 years. However, as described under option 3a, modified grazing practices could improve the condition of pastures in the study area, resulting in beneficial impacts to scenic views.

Study Area Lands outside the Park — If the number of AUMs allocated to the Jackson Hole Hereford Ranch were distributed between the Lazy Double A and the Box L Ranches, there could be more cattle on these ranches in winter months. Overall, the pastoral character of the land would be retained and views would not change. In addition to continued grazing, conservation easements would ensure the long-term protection of these lands from development. Wildlife, historic structures, and archeological sites would be protected if specified in the terms and conditions of the easements.

If developed, impacts to scenic views in study area lands in South Park would be the same as those described for option 1.

Land Uses

Study Area Lands within the Park — Grazing would continue and land use would remain the same as what currently exists today; however, cattle would be managed under new terms and conditions. Present impacts to land use would continue for approximately 25 years, and they could be viewed as beneficial or adverse.

Study Area Lands outside the Park — Land uses on the Spring Gulch properties would remain the same, however, ranches that would be awarded grazing in the park by reallocating AUMs (namely the Lazy Double A and Box L Ranches) might not be grazing cattle on their ranches in the summer months. Instead, cattle associated with these ranches would be trailed to the park. These changes in land use could be viewed as beneficial by some individuals and adverse by others. Land use changes would be moderate and would last approximately 25 years.

Impacts in the South Park area would be the same as those described for option 1 because lands could be sold and developed. It is possible that development could occur on a faster timeline than under option 1. Impacts would be major and long term.

Economic Conditions

The impacts of this option would be comparable to those described for option 3a above, including the assumptions listed on page 62. Terminating grazing privileges for South Park ranching operations would result in a much higher likelihood of those lands being sold and/or developed within a short time. Reallocating and extending grazing privileges and establishing conservation easements would promote higher agricultural productivity in Spring Gulch over the long term. Countywide agricultural productivity could decline slightly with the loss of productivity in South Park.

Land use and development levels in Spring Gulch would remain largely unchanged due to probable development restrictions associated with conservation easements. In South Park current zoning or potential annexation to the town of Jackson would allow for higher density development.

Reallocating grazing privileges from South Park to Spring Gulch properties could reduce the direct outlays needed to acquire conservation easements. From an economic perspective, the reassigned privileges have a net present value of about $1 million, yielding a net cost range for this option of about $136 million to $194 million. Consideration by the benefiting ranchers of non-economic values gained from the grazing privileges could yield additional cost savings; however, the monetary value of such considerations is uncertain. In any event, such outlays would be a major federal expenditure. Under current tax law, a significant portion of the outlay would return to the Treasury in the form of future tax revenue. Changes in tax law unrelated to this project could affect the estimated costs, as could changes in local market conditions and landowner response to the extension of grazing privileges.

Costs associated with maintaining the grazing management program would also be borne by

the National Park Service, but these costs would be minor compared to the cost of conservation easements.

As with the preceding options, no major cumulative economic impacts would be associated with this option. However, the economic future would differ from current conditions.

Visitor Experience and Recreation

The most common visitor activities (viewing scenery, viewing wildlife, and taking photographs) and recreational opportunities in the park would not be altered, nor would scenic qualities or opportunities to view wildlife. These activities would extend beyond park boundaries and could have beneficial impacts on the visitor experience. It is likely that impacts would be negligible since important park values and resources would not be affected.

Compared to options 1 and 2, protecting private lands in Spring Gulch as open space would ensure that the potential impacts of development (increased roads and traffic, and increased pollutant emissions) did not occur. However, the probable development of South Park lands would result in development-related impacts, as described for option 1

OPTION 4: PROTECT ALL PRIVATE STUDY AREA LANDS, BUT DISCONTINUE GRAZING PERMITS

Cultural Resources

Archeological Resources

Study Area Lands within the Park — There would be no new impacts from cattle grazing on cultural resources on these specific pasturelands. However, in order to fulfill requirements under section 110 of the National Historic Preservation Act, Grand Teton National Park would still need to conduct an archeological survey and assessment, as described under option 1.

Study Area Lands outside the Park — Conditions of conservation easements, as described under option 3a, would protect the prehistoric cultural resources on these lands, resulting in long-term beneficial impacts to known sites.

Cultural Landscapes and Historic Structures

Study Area Lands within the Park — There would be a minor adverse effect on the historic cultural landscape of the northern and southern pastures of Grand Teton National Park. Subsequent to the discontinuing of grazing, some historic fencing and irrigation systems could be removed, affecting the cultural landscape. Also, eliminating cattle in these areas would diminish the overall cultural landscape associated with cattle grazing in these areas. However, the end of grazing could also help preserve some of the historic structures, such as the barns along Mormon Row, which are occasionally damaged by cattle.

Study Area Lands outside the Park — There would be minor adverse effects on study area ranches outside the park.

Since grazing within the park would be discontinued, cattle ranching would likely cease on study area ranches in the Spring Gulch and South Park areas. However, under option 4 historic resources on these properties would be protected through conservation easements. The level of protection would depend on the strength of the conservation easements. Nevertheless, the cultural landscapes of study area ranches outside the park would gradually change. While historic buildings, structures, and landscapes would be afforded some level of protection through easements, it is likely that hayfields, irrigation systems, and other landscape features associated with an active cattle ranch operation would be removed. It is also likely under this option that at least limited new construction would occur within the study area, affecting the overall pastoral character and cultural landscape.

In terms of cumulative impact, this option would have a minor adverse effect on the cultural resources of Teton County and Jackson Hole, as it would likely result in at least some negative impacts on the cultural landscapes of ranches outside the park. Also under this option the use of cattle trails to and from Grand Teton National Park would stop, affecting what many local

citizens see as a part of the county's ranching heritage.

Watershed Conditions and Wetlands

Study Area Lands within the Park

There would no longer be a need to irrigate pastures for cattle grazing. Therefore, irrigation and drainage ditches in irrigated pastures would be eliminated, and natural contours would be restored to reestablish the hydrological functioning of these areas.

Diversion of water in the northern pastures would still be necessary but perhaps not to the present extent. Ranches such as Moosehead and Triangle X have water rights and Elk Ranch Reservoir needs to have water diverted to it so that nesting habitat for trumpeter swans can be maintained.

Study Area Lands outside the Park

With the acquisition of conservation easements it is assumed that watershed effects on private lands would remain much the same as they are now unless terms of the easements required a change in use.

Vegetation Condition and Use

Study Area Lands within the Park

Northern Pastures — Rangeland area such as Uhl Hill and Wolff Ridge would be allowed to follow natural succession with the possible use of prescribed fire. This would result in major long-term, beneficial impacts to vegetative communities in the park.

In naturally occurring wetlands, willows and other wetland species might be included in the vegetation restoration plan. Upland areas would be restored to a native sage/grass community.

With the establishment of native plant communities, the need for control of noxious weeds would decrease over time, and there would be a significant reduction in the need for herbicide use.

Southern Pastures — An approved vegetation restoration plan would allow for active restoration of agronomic grasslands in the southern pastures to sage/grass plant communities. Existing native plant communities would be allowed to follow natural successional pathways. Prescribed fire might be used rarely if studies indicated fire would move species composition toward a more natural composition.

Study Area Lands outside the Park

With the acquisition of conservation easements vegetation on private lands would probably remain much the same as now unless terms of the easements required a change in use.

Wildlife Habitat

Study Area Lands within the Park

Impacts would be similar to those described for option 2, but a major difference is that efforts would be made by the park to restore native vegetation to the pastures.

Discontinuing cattle grazing would increase the amount of forage available for native ungulates. Carnivore/cattle conflicts would be eliminated, along with the enticement and management actions that endanger threatened carnivores. The dangers associated with commingling between cattle and brucellosis-infected wild ungulates would also be removed.

Greater water availability in Spread Creek could have positive effects on some wildlife species.

Study Area Lands outside the Park

Under this option all study area lands outside the park would be protected by conservation easements. Cattle grazing could be lost on some ranches if year-round grazing or other grazing alternatives were not feasible on these properties. Without grazing, conflicts due to mingling between brucellosis-infected ungulates and cattle would no longer occur. Conservation easements could serve to protect open space as well as protect wildlife habitat. Some development could take place without total protection of study area properties.

Fisheries

Of greatest importance would be the protection of lands in Spring Gulch and the Spring Creek spawning streams, thus avoiding impacts of development as discussed for options 1 and 2. These impacts are associated with excessive numbers of cattle on private lands during the spawning season, and the irretrievable impacts of eventual development on spawning habitat. It would further avoid the more far-reaching degradation of the entire fishery, which includes the Snake River in Grand Teton National Park. The value of the Snake River cutthroat trout as an important park resource and value would be maintained. Discontinuing grazing in the park could marginally improve watershed conditions with respect to soil compaction and grassland sediment sources. Inasmuch as these areas are also occupied by ungulate species, the general impacts of forage utilization would continue. Restoring native plant communities, eliminating weed species, and taking other measures to restore natural drainages and natural streamflows would positively affect Snake River cutthroat trout habitats within the park.

Air Quality

Grazing in the study area does not directly affect air quality or air quality related values. If private study lands were protected through conservation easements or some other means, short-term impacts related to development (new residential areas, more roads, heavier traffic, and added sources of wood smoke) would be prevented. See the analysis for options 1 and 2. In the long term, the potential for a regional haze that would impact air quality related values and visitor experiences in the park would not be increased.

Scenic Views

Study Area Lands within the Park — Grazing on the northern and southern pastures in the park would be discontinued, and native plant communities would be restored over time. Impacts resulting from the loss of cattle grazing could be beneficial or detrimental depending on individual preferences about cattle grazing as a scenic value in the park. Park management efforts to restore these pastures with native vegetation could result in long-term beneficial impacts to open vistas in the park. There could be adverse impacts to pastoral views in the park on these pastures. This would be a negligible impact.

Study Area Lands outside the Park — Under this option all study area lands outside the park would be protected by conservation easements. All views of study area lands would remain in their current condition as long as land protection methods were designed to protect the entire property from development. However, historic and pastoral views associated with cattle grazing could be lost if year-round grazing or other grazing alternatives were not feasible on these properties. Impacts to views from this action would be negligible to moderate depending on individual preferences regarding cattle grazing as a scenic value outside of the park. Conservation easements could protect some of the openness, pastoral character, and views of the Tetons from these properties. However, some development could occur without total protection of study area properties, compromising the scenic values of study area lands outside the park. Impacts to views of Spring Gulch properties could be moderate to major, depending on the amount of study area land open to development. Impacts to views in South Park would be minor to moderate.

Land Uses

Study Area Lands within the Park — Grazing would cease within the park and pastures would be restored to natural conditions in accordance with an approved management plan. This change in land use would be a moderate, long-term impact.

Study Area Lands outside the Park — All ranches would be protected from development. There would be some question as to the economic viability of continuing ranching operations without park grazing permits. Impacts from a change in land use would be negligible to major over the long term.

Economic Conditions

The implementation of this option would protect all private study area lands, but associated grazing privileges within the park would be terminated, adversely affecting ranch income

derived from livestock operations in the short term. Either herd sizes would have to be reduced, or other higher cost grazing or feeding options would be sought, and the quality-of-life benefits enjoyed by some ranchers would be diminished. However, ranchers would be compensated for these losses under terms of negotiated agreements.

Potential long-term development of up to 1,341 dwelling units, as allowed by Teton County's *Comprehensive Plan,* would not occur because study area lands outside the park would be protected through conservation easements. This reduction in development would be equal to about 20% of the existing residential development in unincorporated Teton County. Consequently, the long-term population of Teton County would be lower than projected. Using the county's planning assumption of 2.1 persons per dwelling, this reduction in development would represent as many as 2,816 fewer new residents in the future. However, many of these residents would have been seasonal or part-time because some units would likely have been second or seasonal homes.

Effects on short-term employment and income associated with real estate development and construction activities would not occur, and the long-term consumer-related economic stimulus associated with the permanent and seasonal residents of these areas would not materialize.

Current zoning allows up to 439 dwelling units to be developed on the Jackson Hole Hereford Ranch in South Park. If this property was annexed to the town of Jackson, higher density development could occur. Protecting this property through a conservation easement would probably preclude annexation by the town, dramatically altering the town's future development and economic future than if annexation occurred. An assessment of the economic implications of either annexing or not annexing the property to the town and the subsequent development implied therewith is beyond the scope of this study.

Implementation costs would be highest with this option, as all private study area lands would be protected. In addition, affected ranchers could negotiate for higher values to offset lower future livestock income as herd sizes were reduced to levels consistent with each ranch's sustainable, year-round carrying capacity. From an economic perspective, the privileges are valued at less than $4 million from a net present value perspective.

The estimated outlay to acquire conservation easements under this option, including the foregone livestock income, range from $172 million to $244 million. Such an outlay would represent a major federal expenditure. A significant portion of the outlay would subsequently return to the Treasury in the form of taxes. (Note: Estimated differences in conservation easement acquisition costs between this option and options 3a and 3b are the result of applying a consistent per acre cost range to the affected properties. This estimate should not, therefore, be interpreted as the incremental cost associated with the South Park property.)

The costs associated with maintaining the grazing management program would be avoided under this option, but the savings would be minor compared to the cost of conservation easements.

Tax law changes could affect the direct costs, as could changes in local market conditions and landowner response to the extension of grazing privileges.

This option would result in an economic future different from that under current conditions. However, these differences do not constitute cumulative impacts.

Visitor Experience and Recreation

Effects on visitor experience and recreation would be the same as options 3a and 3b. Recreational opportunities in the park would not be altered, nor would scenic qualities or opportunities to view wildlife.

Compared to options 1 and 2, protecting private lands in open space would prevent potential impacts of development (such as increased roads and traffic, and increased pollutant emissions). This option would avoid the potential indirect impact of development on clean air and visibility.

APPENDIX A: ESTABLISHING LEGISLATION

An Act To establish a new Grand Teton National Park in the State of Wyoming, and for other purposes, approved September 14, 1950 (64 Stat. 849)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, for the purpose of including in one national park, for public benefit and enjoyment, the lands within the present Grand Teton National Park and a portion of the lands within the Jackson Hole National Monument, there is hereby established a new "Grand Teton National Park". The park shall comprise, subject to valid existing rights, all of the present Grand Teton National Park and all lands of the Jackson Hole National Monument that are not otherwise expressly provided for in this Act, and an order setting forth the boundaries of the park shall be prepared by the Secretary of the Interior and published in the Federal Register. The national park so established shall, so far as consistent with the provisions of this Act, be administered in accordance with the general statutes governing national parks, and shall supersede the present Grand Teton National Park and the Jackson Hole National Monument. The Act of February 26, 1929 (45 Stat. 1314), and any other provisions of law heretofore specifically applicable to such present park or monument, are hereby repealed: *Provided*, That no further extension or establishment of national parks or monuments in Wyoming may be under-

taken except by express authorization of the Congress. (16 U.S.C. §§ 406d–1 and note, 431a, 451a.)

National Elk Refuge. Lands from Jackson Hole National Monument.

SEC. 2. The following-described lands of the Jackson Hole National Monument are hereby made a part of the National Elk Refuge and shall be administered hereafter in accordance with the laws applicable to said refuge:

SIXTH PRINCIPAL MERIDIAN

Township 42 north, range 116 west: Those portions of sections 24, 25, 26, and 35 lying east of the east right-of-way line of United States Highway Numbered 187, and lying south and east of the north and west bank of the Gros Ventre River.

Township 42 north, range 115 west: Those portions of sections 8, 9, 10, 17, 18, and 19 lying south and east of the north and west bank of the Gros Ventre River; section 20; section 29, northwest quarter; section 30, north half.

Township 41 north, range 116 west: Entire portion now in Jackson Hole National Monument except that portion in section 2 lying west of the east right-of-way line of United States Highway Numbered 187.

Containing in all six thousand three hundred and seventy-six acres, more or less. (16 U.S.C. § 673b.)

Teton National Forest. Lands from Jackson Hole National Monument.

SEC. 3. The following-described lands of the Jackson Hole National Monument are hereby made a part of the Teton National Forest and shall be administered hereafter in accordance with the laws applicable to said forest:

SIXTH PRINCIPAL MERIDIAN

Township 45 north, range 113 west: Section 21, lot 5; section 22, lots 2 and 6; section 23, lot 3; section 26, lots 2, 3, 6, 7, southwest quarter northwest quarter, southwest quarter and southwest quarter southeast quarter; section 27, lots 1, 2, 4, 6, 7, 8, 9, southeast quarter northeast quarter and south half; section 28, lot 1, southeast quarter northeast quarter and east half southeast quarter; section 29 lots 2, 4, 5, 6, 8, southwest quarter northeast quarter, northwest quarter southeast quarter, south half northwest quarter, and north half southwest quarter; section 30, lot 7, south half northeast quarter, north half southeast quarter and southeast quarter southeast quarter; section 31, lots 1 and 2; section 32, lots 2 and 5; section 33, east half northeast quarter and northeast quarter southeast quarter; section 34, north half and north half south half; section 35, north half, containing in all two thousand eight hundred six and thirty-four one-hundredths acres, more or less. (16 U.S.C. § 482m.)

Grand Teton National Park.

SEC. 4. With respect to those lands that are included by this Act within the Grand Teton National Park—

Rights-of-way, etc.

(a) the Secretary of the Interior shall designate and open rights-of-way, including stock driveways,

over and across Federal lands within the exterior boundary of the park for the movement of persons and property to or from State and private lands within the exterior boundary of the park and to or from national forest, State, and private lands adjacent to the park. The location and use of such rights-of-way shall be subject to such regulations as may be prescribed by the Secretary of the Interior;

Existing leases, etc.

(b) all leases, permits, and licenses issued or authorized by any department, establishment, or agency of the United States with respect to the Federal lands within the exterior boundary of the park which are in effect on the date of approval of this Act shall continue in effect, subject to compliance with the terms and conditions therein set forth, until terminated in accordance with the provisions thereof;

5 U.S.C. § 485; 16 U.S.C. §§ 1, 2–4, 22, 43.

(c) where any Federal lands included within the park by this Act were legally occupied or utilized on the date of approval of this Act for residence or grazing purposes, or for other purposes not inconsistent with the Act of August 25, 1916 (39 Stat. 535), pursuant to a lease, permit, or license issued or authorized by any department, establishment, or agency of the United States, the person so occupying or utilizing such lands and the heirs, successors, or assigns of such person, shall, upon the termination of such lease, permit, or license, be entitled to have the privileges so possessed or enjoyed by him renewed from time to time, subject to such terms and conditions as the Secretary of the Interior shall prescribe, for a period of twenty-five years from the date of approval of this Act, and thereafter during the lifetime of such person and the lifetime of his heirs, successors, or assigns but only if they were members of his immediate family on such date, as determined by the Secretary of the Interior: *Provided*, That grazing privileges appurtenant to privately owned lands located within the Grand Teton National Park established by this Act shall not be withdrawn until title to lands to which such privileges are appurtenant shall have vested in the United States, except for failure to comply with the regulations applicable thereto after reasonable notice of default: *Provided further*, That nothing in this subsection shall apply to any lease, permit, or license for mining purposes or for public accommodations and services or to any occupancy or utilization of lands for purely temporary purposes. Nothing contained in this Act shall be construed as creating any vested right, title, interest, or estate in or to any Federal lands. (16 U.S.C. § 406d–2.)

Grazing privileges.

Mining leases, etc.

Compensation for tax losses.

SEC. 5. (a) In order to provide compensation for tax losses sustained as a result of any acquisition by the United States, subsequent to March 15, 1943, of privately owned lands, together with any improvements thereon, located within the exterior boundary of the Grand Teton National Park established by this Act, payments shall be made to the State of Wyoming for distribution to the county in which such lands are located in accordance with the following schedule of payments: For the fiscal year in which the land has been or may be acquired and nine years thereafter there shall be paid an amount equal to the full amount of annual taxes last assessed and levied on the land, together with any improvements thereon, by public taxing units in such county, less any amount, to be determined by the Secretary of the Interior, which may have been paid on account of taxes for any period falling within such fiscal year. For each succeeding fiscal year, until twenty years elapse, there shall be paid on account of such land an amount equal to the full amount of taxes referred to in the preceding sentence, less 5 per centum of such full amount for each fiscal year, including the year for which the payment is to be made: *Provided*, That the amount payable under the foregoing schedule for any fiscal year preceding the first full fiscal year following the approval of this Act shall not become payable until the end of such first full fiscal year.

Schedule of payments.

(b) As soon as practicable after the end of each fiscal year, the amount then due for such fiscal year shall be computed and certified by the Secretary of the Interior, and shall be paid by the Secretary of the Treasury: *Provided*, That such amount shall not exceed 25 per centum of the fees collected during such fiscal year from visitors to the Grand Teton National Park established by this Act and the Yellowstone National Park. Payments made to the State of Wyoming under this section shall be distributed to the county where the lands acquired from private landowners are located and in such manner as the State of Wyoming may prescribe. (16 U.S.C. § 406d–3.)

Program for conservation of elk.

SEC. 6. (a) The Wyoming Game and Fish Commission and the National Park Service shall devise, from technical information and other pertinent data assembled or produced by necessary field studies or investigations conducted jointly by the technical and administrative personnel of the agencies involved, and recommend to the Secretary of the Interior and the Governor of Wyoming for their joint approval, a program to insure the permanent conservation of the elk within the Grand Teton National Park established by this Act. Such program shall include the controlled reduction of elk in such park, by hunters licensed by the State of Wyoming and deputized as rangers by the Secretary of the Interior,

when it is found necessary for the purpose of proper management and protection of the elk.

Yearly plan.

(b) At least once a year between February 1 and April 1, the Wyoming Game and Fish Commission and the National Park Service shall submit to the Secretary of the Interior and to the Governor of Wyoming, for their joint approval, their joint recommendations for the management, protection, and control of the elk for that year. The yearly plan recommended by the Wyoming Game and Fish Commission and the National Park Service shall become effective when approved by the Secretary of the Interior and the Governor of Wyoming, and thereupon the Wyoming Game and Fish Commission and the Secretary of the Interior shall issue separately, but simultaneously such appropriate orders and regulations as are necessary to carry out those portions of the approved plan that fall within their respective jurisdictions. Such orders and regulations, to be issued by the Secretary of the Interior and the Wyoming Game and Fish Commission, shall include provision for controlled and managed reduction by qualified and experienced hunters licensed by the State of Wyoming and deputized as rangers by the Secretary of the Interior, if and when a reduction in the number of elk by this method within the Grand Teton National Park established by this Act is required as a part of the approved plan for the year, provided that one elk only may be killed by each such licensed and deputized ranger. Such orders and regulations of the Secretary of the Interior for controlled reduction shall apply only to the lands within the park which lie east of the Snake River and those lands west of Jackson Lake and the Snake River which lie north of the present north boundaries of Grand Teton National Park, but shall not be applicable to lands within the Jackson Hole Wildlife Park. After the Wyoming Game and Fish Commission and the National Park Service shall have recommended to the Secretary of the Interior and the Governor of Wyoming in any specified year a plan, which has received the joint approval of the Secretary of the Interior and the Governor of Wyoming, calling for the controlled and managed reduction by the method prescribed herein of the number of elk within the Grand Teton National Park established by this Act, and after the Wyoming Game and Fish Commission shall have transmitted to the Secretary of the Interior a list of persons who have elk hunting licenses issued by the State of Wyoming and who are qualified and experienced hunters, on or before July 1 of that year the Secretary of the Interior, without charge, shall cause to be issued orders deputizing the persons whose names appear on such list, in the number specified by the plan, as rangers for the purpose of entering the park and assisting in the controlled reduc-

Orders and regulations.

Provision for controlled reduction.

Deputized rangers.

tion plan. Each such qualified hunter, deputized as a ranger, participating in the controlled reduction plan shall be permitted to remove from the park the carcass of the elk he has killed as a part of the plan. (16 U.S.C. § 673c.)

Acceptance of donated lands.

SEC. 7. The Secretary of the Interior is authorized to accept the donation of the following-described lands, which lands, upon acceptance by the United States, shall become a part of the national park:

SIXTH PRINCIPAL MERIDIAN

Township 41 north, range 116 west: Section 3, lots 1 and 2.

Containing seventy-eight and ninety-three one-hundredths acres, more or less. (16 U.S.C. § 406d–4.)

Revocation of temporary withdrawals.

SEC. 8. All temporary withdrawals of public lands made by Executive order in aid of legislation pertaining to parks, monuments, or recreational areas, adjacent to the Grand Teton National Park as established by this Act are hereby revoked. (16 U.S.C. § 406d–1 note.)

Use of lands for reclamation purposes, etc. 43 U.S.C. § 372 *et seq.*; Sup. III, § 373a *et seq.*

SEC. 9. Nothing in this Act shall affect the use for reclamation purposes, in accordance with the Act of June 17, 1902 (32 Stat. 388), and Acts amendatory thereof or supplementary thereto, of the lands within the exterior boundary of the park as prescribed by this Act which have been withdrawn or acquired for reclamation purposes, or the operation, maintenance, rehabilitation, and improvement of the reservoir and other reclamation facilities located on such withdrawn or acquired lands. All provisions of law inconsistent with the provisions of this Act are hereby repealed to the extent of such inconsistency. The remaining unexpended balance of any funds appropriated for the present Grand Teton National Park and the Jackson Hole National Monument shall be available for expenditure in connection with the administration of the Grand Teton National Park established by this Act. (16 U.S.C. §§ 406d–5, 406d–1 note.)

Availability of funds.

APPENDIX B: PUBLIC LAW 105-81

H.R.708

One Hundred Fifth Congress

of the

United States of America

AT THE FIRST SESSION

Begun and held at the City of Washington on Tuesday,

the seventh day of January, one thousand nine hundred and ninety-seven

An Act

To require the Secretary of the Interior to conduct a study concerning grazing use and open space within and adjacent to Grand Teton National Park, Wyoming, and to extend temporarily certain grazing privileges.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. FINDINGS.

Congress finds that--

(1) open space near Grand Teton National Park continues to decline;

(2) as the population continues to grow in Teton County, Wyoming, undeveloped land near the Park becomes more scarce;

(3) the loss of open space around Teton Park has negative impacts on wildlife migration routes in the area and on visitors to the Park, and its repercussions can be felt throughout the entire region;

(4) a few ranches make up Teton Valley's remaining open space, and the ranches depend on grazing in Grand Teton National Park for summer range to maintain operations;

(5) the Act that created Grand Teton National Park allowed several permittees to continue livestock grazing in the Park for the life of a designated heir in the family;

(6) some of the last remaining heirs have died, and as a result the open space around the Park will most likely be subdivided and developed;

(7) in order to develop the best solution to protect open space immediately adjacent to Grand Teton National Park, the Park Service should conduct a study of open space in the region; and

(8) the study should develop workable solutions that are fiscally responsible and acceptable to the National Park Service, the public, local government, and landowners in the area.

SECTION 2. STUDY OF GRAZING USE AND OPEN SPACE.

(a) IN GENERAL - The Secretary of the Interior shall conduct a study concerning grazing use and open space in Grand Teton National Park, Wyoming, and associated use of certain agricultural and ranch lands within and adjacent to the Park, including --

(1) base land having appurtenant grazing privileges within Grand Teton National Park, Wyoming, remaining after January 1, 1990, under the Act entitled `An Act to establish a new Grand Teton National Park in the State of Wyoming, and for other purposes', approved September 14, 1950 (16 U.S.C. 406d-1 et seq.); and

(2) any ranch and agricultural land adjacent to the Park, the use and disposition of which may affect accomplishment of the purposes of the Act.

(b) PURPOSE - The study shall --

(1) assess the significance of the ranching use and pastoral character of the land (including open vistas, wildlife habitat, and other public benefits);

(2) assess the significance of that use and character to the purposes for which the Park was established and identify any need for preservation of, and practicable means of, preserving the land that is necessary to protect that use and character;

(3) recommend a variety of economically feasible and viable tools and techniques to retain the pastoral qualities of the land; and

(4) estimate the costs of implementing any recommendations made for the preservation of the land.

(c) PARTICIPATION - In conducting the study, the Secretary of the Interior shall seek participation from the Governor of the State of Wyoming, the Teton County Commissioners, the Secretary of Agriculture, affected land owners, and other interested members of the public.

(d) REPORT - Not later than 3 years from the date funding is available for the purposes of this Act, the Secretary of the Interior shall submit a report to Congress that contains the findings of the study under subsection (a) and makes recommendations to Congress regarding action that may be taken with respect to the land described in subsection (a).

SECTION 3. EXTENSION OF GRAZING PRIVILEGES.

(a) IN GENERAL - Subject to subsection (b), the Secretary of the Interior shall reinstate and extend for the duration of the study described in section 2(a) and until such time as the recommendations of the study are implemented, the grazing privileges described in section 2(a)(1), under the same terms and conditions as were in effect prior to the expiration of the privileges.

(b) EFFECT OF CHANGE IN LAND USE - If, during the period of the study or until such time as the recommendations of the study are implemented, any portion of the land described in section 2(a)(1) is disposed of in a manner that would result in the land no longer being used for ranching or other agricultural purposes, the Secretary of the Interior shall cancel the extension described in subsection (a).

Speaker of the House of Representatives.

Vice President of the United States and

President of the Senate.

END

APPENDIX C: METHODOLOGIES FOR DEVELOPING THE OPTIONS

SCENIC VIEWSHEDS

Public Law 105-81 directs that the study the "assess the significance of the ranching use and pastoral character of the land (including open vistas, wildlife habitat, and other public benefits)." It also directs that the study assess the significance of that use and character to the purposes for which the park was established." Given this direction and the findings of the Open Space Work Group, the planning team created the following criteria to evaluate views from and across the study area properties outside of the park:

- *To what degree do study area properties preserve the historic scene associated with cattle ranching in Jackson Hole?* (Based on PL 105-81, sec. 2(b) (1); Open Space Work Group Report).

- *To what degree do study area properties have open views of the valley towards the Teton Range that are not constrained by topography or development?* (Based on PL 105-81, sec. 2 (b) (1), Open Space Work Group Report).

- *To what degree are views of the Teton Range inside park boundaries visible from study area properties?* (Based on park purpose and significance.)

- *To what degree are views unobstructed by surrounding residences, outbuildings, and associated structures that may intrude on the natural scene that the park was created to preserve?* (Based on lack of visible development from the property; Open Space Work Group Report.)

The planning team used GIS viewshed maps, photos, and their own knowledge from field visits to rank views from each of the study area properties. In addition, the planning team used photos taken from each viewpoint to note non-topographic obstructions to views such as trees and buildings. The team also discussed viewshed features based on prior individual and team site visits. Each study area property was ranked to the degree to which the criteria were met. Viewpoints taken from park and other prominent points towards the properties were not assessed with these criteria.

The Mead, Lazy Double A, and Box L Ranches all scored high. The Hansen Ranch scored lower because views were partially constrained by topography, and surrounding development was to the north. The Jackson Hole Hereford Ranch scored the lowest because of minimal to no views of the Teton Range, and open vistas were constrained by development.

EFFECTIVE WILDLIFE CORRIDOR ACCESS TO THE PARK

PL 105-81 states that the study shall "assess the significance of the ranching use and pastoral character of the land (including . . . wildlife habitat)." Based on this law and a goal of this study to maintain or enhance effective wildlife

Table C-1: Views from Study Area Properties toward the Park

	Mead	Hansen	Lazy Double A	Box L	Jackson Hole Hereford Ranch
Pastoral Quality	High	High	High	High	High
Open Vistas	High	High on northern end, not as open on southern portions	High	High	Moderate
Teton Range	High (Full view)	Northern end, full view. Partial view on Southern portions	High (Full view)	High (Full view)	Low (Minimal view mostly obstructed)
Lack of Development	High	Moderate (equestrian center and homes visible in the midground)	High	High	Low

habitat, including corridors, the planning team defined "effective wildlife habitat and corridors" as

> areas used by wildlife that, if developed, would result in a loss of needed habitat, probably resulting in a reduction of a population or subpopulation of the species being considered. The assessment of lands with regard to wildlife habitat was based on known species distribution.

For study area lands within the park aerial and ground surveys of both marked and unmarked individuals provided information about use within the park. For study area lands outside the park, biologists from Wyoming Game and Fish and United States Fish and Wildlife Service were consulted. Individual study area properties were also ranked by the quality of habitat available to particular groups of wildlife species. These groups were neotropical birds, trumpeter swans, bald eagles, large ungulates, and large carnivores. Rankings were provided by Wyoming Game and Fish biologists (Bohne and Patla, pers. comm.) and by a U. S. Fish and Wildlife Service Biologist (Smith, pers. comm.).

Based on the results of the habitat quality assessment, the ranches were compared and ranked from 5 (highest quality habitat) to 1 (lowest).

HISTORIC RANCHING SCENE

As defined by Public Law 105-81, one of the purposes of the open space study was to "assess the significance of the ranching use and pastoral character of the land" within the study areas." In addition to meeting at least one of the criteria for eligibility for listing on the National Register of Historic Places (see page 18), a significant historic property generally must be at least 50 years old and must possess integrity. Integrity is reflected through historic qualities such as location, design, setting, materials, workmanship, feeling, and association. Each of the ranching properties is analyzed according to these criteria, beginning on page 18.

All of the ranching properties within the study area include historic buildings and structures, and they are also all cultural landscapes. According to the National Park Service's *Cultural Resource Management Guideline* (DO-28), a cultural landscape is:

> a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions.

Table C-2: Habitat Quality Assessment — Study Area Lands outside the Park

Ranches	Neotropical Birds		Large Ungulates		Trumpeter Swans		Bald Eagles		Large Carnivores	
	Ind.	Pop.	Ind.	Pop.	Ind.	Pop.	Ind.	Pop.	Ind.	Pop.
Mead	H	M	H	M	H	L	H	L	H	L
Hansen	M	L	H	L	M	L	M	L	H	L
Box L	L	L	H	M	L	L	L	L	H	L
Lazy Double A	H	L	M	L	L	L	L	L	H	L
Jackson Hole Hereford Ranch	L	L	L	L	L	L	L	L	H	L

Ind. — individual animals; Pop. — species population
H — high, M — medium, L — low.

Table C-3: Wildlife Habitat Ranking of Study Area Lands outside the Park

Ranches	Neotropical Birds	Large Ungulates	Trumpeter Swans	Bald Eagles	Large Carnivores	Total
Mead	5	4	5	5	2	21
Hansen	4	3	4	4	2	17
Box L	2	2	2	2	2	10
Lazy Double A	3	4	3	3	2	15
Jackson Hole Hereford Ranch	1	2	1	1	2	7

Specifically, the cultural landscapes in the study area are rural historic landscapes. The integrity of these landscapes is evaluated by the degree to which the property represents its historic land use activities, such as raising cattle, grazing, haying, and crop production. Rural historic landscapes include a variety of physical components such as barns, orchards, cultivated fields, fence lines, roads, irrigation ditches, tree lines, hedge rows and corrals, as well as buildings and structures that contribute to the overall pastoral character and setting of the property.

Properties listed on the National Register of Historic Places also are evaluated as to whether they are significant at the local, state, or national level. All of the historic resources and cultural landscapes within the open space study areas are significant at the local and/or state level. Therefore, all properties are of equal ranking in terms of historic resources and cultural landscapes.

APPENDIX D: POTENTIAL DEVELOPMENT SCENARIOS FOR LANDS WITHIN THE STUDY AREA ADJACENT TO THE PARK

MEAD/HANSEN RANCHES

According to the Teton County Assessor's Office taxable acreage figures, the ranch has a gross site area of 3,067.40 acres. The entire ranch is in the Rural District

Uses permitted in the Rural District (Table 2200 of the *Teton County Land Development Regulations*) include a variety of residential and nonresidential. A development permit is required to subdivide the land for residential development. The following calculations represent the most intensive residential development options offered under the current zoning.

Gross site area	3,067.40 ac
ROW ((13,520' x 60')+ (6,170' x 30'))	-22.87 ac
Waterbodies (Gros Ventre River, pond, and Spring Creek; unknown if other spring creeks exist)	-104.55 ac
Steep slopes (50% of 1,418 acres)	- 709.00 ac
Base site area (BSA) estimated	2,231 ac

Planned Residential Development (PRD) Options:

- 2,231 ac x 0.057 dwelling unit/ac = 127 dwelling units with 50% open space required
- 2,231 ac x 0.171 dwelling unit/ac = 381 dwelling units with 70% open space required
- 2,231 ac x 0.257 dwelling unit/ac = 573 dwelling units with 85% open space required

Planned Unit Development (PUD) Option:

A density bonus for affordable housing is available via this PUD option. It is based on the amount of base density allowed. It is not available when an applicant is using the 85% open space development option. As a result, this PUD option could provide as much as a 72 unit bonus, based on the 70% PRD option above (381 dwelling units x 0.19 = 72 dwelling units bonus) for a development total of 453 dwelling units on 3,067.4 acres.

Maximum number of dwelling units estimated under current zoning: 573

BOX L RANCH

According to the Assessor's Office taxable acreage figures, the ranch has a gross site area of 760 acres. The entire ranch is in the Rural District.

Uses permitted in the Rural District include a variety of residential and nonresidential uses. To subdivide the land for residential development, a development permit is required. The following calculations represent the most intensive residential development options offered under the current zoning.

Gross site area	760 ac
ROW (6000' x 60')	-8.26 ac
Waterbodies (6000' x 10')	-1.4 ac
Steep slopes (50% of 290 acres)	-145 ac
Base site area (BSA) estimated	605.34 ac

Planned Residential Development (PRD) Options:

- 605.34 ac x 0.057 dwelling unit/ac = 34 dwelling units with 50% open space required
- 605.34 ac x 0.171 dwelling unit/ac = 103 dwelling units with 70% open space required
- 605.34 ac x 0.257 dwelling unit/ac = 155 dwelling units with 85% open space required

Planned Unit Development (PUD) Option:

A density bonus for affordable housing is available via this PUD option. It is based on the amount of base density allowed. It is not available when an applicant is using the 85%

open space development option. As a result, this PUD option could provide as much as a 19 unit bonus, based on the 70% PRD option above (103 dwelling units x 0.19 = 19 dwelling units bonus) for a development total of 122 dwelling units on 760 acres.

Maximum number of dwelling units estimated under current zoning: 155

LAZY DOUBLE A RANCH

According to the Assessor's Office taxable acreage figures, the ranch has a gross site area of 871.22 acres. The entire ranch is in the Rural District.

Uses permitted in the Rural District include a variety of residential and nonresidential uses. To subdivide the land for residential development, a development permit would be required. The following calculations represent the most intensive residential development options offered under the current zoning.

Gross site area	871.22 ac
ROW ((1380' x 60')+ (5960' x 30')+(4020' x 150'))	-19.85 ac
Waterbodies (Gros Ventre River and Spring Creek; unknown if other spring creeks exist)	-30.8 ac
Steep slopes (50% of 286acres)	-143 ac
Base Site Area (BSA) estimated	677.57 ac

Planned Residential Development (PRD) Options:

- 677.57 ac x 0.057 dwelling unit/ac = 38 dwelling units with 50% open space required
- 677.57 ac x 0.171 dwelling unit/ac = 115 dwelling units with 70% open space required
- 677.57 ac x 0.257 dwelling unit/ac = 174 dwelling units with 85% open space required

Planned Unit Development (PUD) Option:

A density bonus for affordable housing is available via this PUD option. It is based on the amount of base density allowed. It is not available when an applicant is using the 85% open-space development option. As a result, this PUD option could provide as much as a 21 unit bonus, based on the 70% PRD option above (115 dwelling units x 0.19 = 21 dwelling units bonus,) for a development total of 136 dwelling units on 871.22 acres.

Maximum number of dwelling units estimated under current zoning: 174

JACKSON HOLE HEREFORD RANCH

According to the Assessor's Office taxable acreage figures, the ranch has a gross site area of 895.66 acres. Two parcels are in the Suburban District; the rest of the ranch is in the Rural District.

Suburban District

To subdivide the land for residential development, a development permit is required for either a PRD or PUD. The following calculations estimate the maximum amount of development permitted in this district. In addition, institution residential uses may be permitted, as well as a variety of nonresidential uses, as indicated in Table 2200.

Gross site area	40.01 ac
ROW, waterbodies, slopes	-0 ac in
Base Site Area (BSA) estimated	40.01 ac

Planned Residential Development (PRD) Options:

- 40.01 ac x 3.64 dwelling units/ac = 145 dwelling units with 25% open space required.
- 40.01 ac x 4.00 dwelling units/ac = 160 dwelling units with 35% open space required.

Planned Unit Development (PUD) Option:

A density bonus for affordable housing is available via this PUD option. It is based upon

the amount of base density allowed. As a result, this option could provide as much as a 72 unit bonus, based on the 35% PRD option above (160 dwelling units x 0.45 = 72 dwelling units bonus,) for a development total of 232 dwelling units on 40.01 acres.

Maximum number of dwelling units under current zoning: 232

Rural District

In the Rural District a variety of residential and nonresidential uses may be permitted. To subdivide the land for residential development, a development permit is required. The following calculations represent the most intensive residential development options offered under the current zoning.

895.66 acres – 40.01 acres in Suburban District = 855.65 acres in Rural District

Gross site area	855.65 ac
ROW	-0 ac
Waterbodies	-5.5 ac
steep slopes (50% of 85 acres)	-42.50 ac
Base Site Area (BSA) estimated	807.65 ac

Planned Residential Development (PRD) Options:

807.65 ac x 0.057 dwelling unit/ac = 46 dwelling units with 50% open space required

807.65 ac x 0.171 dwelling unit/ac = 138 dwelling units with 70% open space required

807.65 ac x 0.257 dwelling unit/ac = 207 dwelling units with 85% open space required

Planned Unit Development (PUD) Option:

A density bonus for affordable housing is available via this PUD option. It is based on the amount of base density allowed. It is not available when an applicant is using the 85% open space development option. As a result, this PUD option could provide as much as a 26 unit bonus, based on the 70% PRD option above (138 dwelling units x 0.19 = 26 dwelling unit bonus,) for a development total of 164 dwelling units on 855.65 acres.

Maximum number of dwelling units estimated under current zoning: 207

Total for the Jackson Hole Hereford Ranch

Based on current zoning, the total development potential for the ranch is estimated to be 232 + 207 = 439

APPENDIX E: PUBLIC BENEFITS AND LOCAL COMMUNITIES

Identifiable groups of people express opinions, attitudes, and beliefs about topics relevant to this study. Opinions, attitudes, and beliefs can generally be constructed by examining materials developed by the Open Space Work Group, through comments on the "Short-Term Grazing Environmental Assessment," or through public involvement for other actions. The groupings are based on "communities of interest" who tend to react in predictable ways to proposed actions, and who advocate for certain outcomes when decisions are made. Clearly, there may be any number of ways to categorize social groupings. However, the following characterizations facilitate an assessment of how controversial the different options might be regarding open space and related issues. The characterizations are intended to be generalized in that no particular individual or entity is being described, although individuals may be able to identify with one or more of the communities described. (There is no intent by the National Park Service to judge the opinions, values or beliefs of any one group; only to describe what is known about them.) A key element of this discussion relates to "public benefit," in reference to PL 105-81. Public benefit can be interpreted in an economic context, as discussed above, or in terms of benefits associated with alternative land uses. Key public benefits include public enjoyment of park resources and values and "recreation opportunities. Communities of interest are described below, in no particular order, and assumptions are made about their views on public benefits associated with open space.

LOCAL AND STATE GOVERNMENT

Expressed attitudes, values and beliefs within this group are mixed. Some commonality is evident in an understanding and agreement with the need to preserve open space. However, beliefs in regard to the tools that are available or should be used to achieve this purpose, such as grazing as a long-term use of the park, are variable. Some governmental entities refer to the open-space study and express great interest in maintaining open space in Teton County while preserving the ranching heritage. Others reluctantly endorse continued grazing as a means of preventing future unwanted growth in the area. Some entities are more concerned about maintaining grazing operations for their own sake, as a valid commercial interest. The Teton County *Comprehensive Plan* expresses goals dealing with preserving both open space and the ranching heritage.

Public benefits of open space from the standpoint of local and state governments are many and varied. The views of different agencies and governmental entities vary according to their differing missions. As a whole, public benefits are viewed as including the economic value of the park to local businesses, the quality of life values for residents, the value of wildlife and scenic resources, the cultural landscape associated with ranching, recreational opportunities, and the inherent value of the ranching and grazing business. Most governmental entities would likely agree that these benefits and values are interrelated, but some aspects may be regarded as more important than others in terms of management objectives.

RANCHING COMMUNITY

Expressed attitudes, values, and beliefs within this group are reasonably homogeneous. They point out the value of ranching and grazing as a cultural imperative for the long term. Some express opinions about the lack of impacts of grazing on park resources or values, indicating that grazing is a suitable tool for maintaining open space. With reference to the "Short-Term Grazing Environmental Assessment" (NPS 2000b), permittee representatives note that measures for environmental protection would necessitate some changes in permit terms and conditions, potentially making ranching operations unviable. Therefore, ranchers appear to be mindful of a relationship, with ordered priorities, among ranch values (business and culture), open-space values, and continued grazing practices and numbers as they have evolved to date.

Public benefits of open space from the standpoint of the ranching community seem to focus on the cultural landscape and the lifestyle associated with ranching, as well as the inherent value of the ranching and grazing business. The ranching community feels that these benefits are consistent with and supportive of park values that yield other benefits to visitors. For example, some ranching advocates state that many visitors derive enjoyment from the rural setting and the active ranching operation viewed in the park. They point out that the ranching business and culture preceded the park's establishment, and that the establishment legislation recognized these benefits by allowing them to continue. They state further that part of the intent for establishing the park was to retain the rural and cultural character of the area in the face of rapid growth and development in 1950.

BUSINESS COMMUNITY

The business community, other than ranching, is not a readily identifiable community of interest for this analysis. It can be assumed that, as with local government, attitudes, values, and beliefs are mixed with respect to methods for achieving or maintaining open space. It is certain that some segments of the business community have interests in the sale of lands for development purposes. Other segments may have more of a direct interest in preserving open space and the ranching heritage as a means of maintaining the attractiveness of the area for tourism and seasonal recreation.

The public benefit of open space from the standpoint of the business community seems strongly related to opportunities for visitor enjoyment and recreation in the park. Such benefits would include a variety of recreational opportunities, scenic views, clean air, the presence of wildlife for viewing and hunting, and spaces with quiet and solitude. Maintaining values and resources that continue to attract people to the Jackson Hole area both to visit and to live are linked to the economic health of the area. It can be inferred that most employers are located here because they enjoy the quality of life and they can attract employees for this same reason. There may not be the same recognition of open space values associated with the private lands in the study area, as opposed to those associated with public lands in the park proper.

ENVIRONMENTAL COMMUNITY

Expressed attitudes, values, and beliefs within this group are reasonably homogeneous. Although some reluctantly recognize the legal necessity to reissue permits for the short term, all believe that grazing is not an acceptable use of national park lands. A few think that some grazing could be maintained if it is determined that park resources are not being impacted, but at reduced levels and only for purposes of maintaining open space in the county. A number of writers provided opinions on grazing impacts that were adverse to bison and elk, soil and water, riparian areas, natural vegetation, and threatened or endangered species. The ordering of priorities in achieving desired public benefits runs counter to that which is evident in the ranching community.

The public benefit of open space from the standpoint of the environmental community appears strongly related to the maintenance of a natural, functional ecosystem. This would include the attainment of natural waterways and aquatic environments, spaces unencumbered by development and structures, effective corridors for wildlife movement, and the maintenance of native flora and fauna. For most who identify themselves as part of this community, this is the primary purpose for which the parks were created and therefore of utmost public benefit. Secondary benefits of ecosystem maintenance include the protection of scenic values, recreation in a natural setting, and other experiential values for visitors. This view is very nearly a counterpoint to that described for the ranching community. There is some sense that continued grazing in the park may be related to maintaining some critical ecosystem values — wildlife habitat and migration corridors, for example — and that this tradeoff may be necessary and worthwhile in lieu of other tools that may achieve the same goal. However, ranching business and culture seem to be regarded as secondary benefits, and any continued grazing would need to be accomplished under changed terms and conditions for mitigating current environmental impacts.

OPEN SPACE WORK GROUP

As described on page 8, the Open Space Work Group is composed of representatives of all the preceding communities of interest, plus representatives from the National Park Service and other federal agencies and citizens at large. The group has issued a report on its activities and findings over a period of two years (Grand Teton National Park Open Space Work Group 2000). As a group, there is some agreement on objectives and goals (public benefits) relating to open space. However, there is no consensus regarding priorities for park management or how grazing and open space fit into those priorities. Positions of various members fall into one or more of those described for various communities of interest, above.

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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.